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COMMAND AND GENERAL STAFF SCHOOL

FORT LEAVENWORTH, KANSAS

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A MONTHLY REVIEW OF MILITARY LITERATURE

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With the approach of winter many at home are already thoughtfully considering the Christmas season and the gifts which will be sent to those in the Army. All those in the armed forces now will become more and more aware of the approach of Christmas with each passing day; and they also are thinking of the gifts they would like to send home.

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VOLUME XXIV NOVEMBER 1944 NUMBER 8

COMMAND AND GENERAL STAFF SCHOOL

MILITARY REVIEW

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Corps Staff Functions and Procedures in Combat

FOREWORD

By Commanding General, II Corps

A General Staff Officer of G-3 Training Section, NATOUSA, spent several days at Headquarters II Corps as an observer. While here, he discussed staff operation and procedure with many members of the staff. His manuscript, based upon these discussions, was later submitted to my staff for their comments. Their comments have been incorporated. This article correctly portrays staff operations of the II Corps staff.

/s/ Geoffrey Keyes,
Major General, U. S. A.,
Commanding.

MUCH has been published covering the tactical lessons and combat experience resulting from the campaigns in the Mediterranean Area. The official lessons prepared and issued by Allied Force Headquarters and the headquarters of the North African Theater of Operations have treated the tactical field with satisfactory completeness and detail. Little, however, has been disseminated on the experience and lessons of the higher staffs. Since staff functions are so closely integrated and are so interdependent with tactical operations in combat, the experience and developments of the staff of II Corps, the only staff organization of this category which has served in all three campaigns in this theater, should be of timely interest. The following material, though reflecting much of the progressive and cumulative development from the fighting in Tunisia and Sicily, is largely concerned with staff experience in the Italian campaign.

Broadly speaking, the staff of II Corps follows the standard, established procedures. Experience in three campaigns has demonstrated that the basic principles and doctrine prescribed in our staff manuals and training literature are excellent and adequate. Flexibility, judgment, and appropriate application are most essential, and variations within the broad framework of general principle are often necessary to meet the needs of changing field conditions. The idea may occur after taking the field that the "book" can be forgotten when the combat stage is reached and that the staff can go ahead on its own independent way. This notion is definitely unsound, and should be avoided. II Corps has no complaints or criticisms to make of the standard teachings. They have been supplemented and varied as necessary, and the Corps staff has produced several developments. But established procedures form a sound basis of practical operation.

One point worth noting as a result of staff operations in the several campaigns has been the necessity of recognizing and understanding the variation in the manner of using staffs by the different individual commanders. Within the broad framework of established principle, it must be remembered that each commander will use his staff in accordance with his own methods of command and scheme of action. It is not to be expected that each commander will use his staff in exactly the same way, and staff officers who keep this fact in mind will attain a greater measure of usefulness through their understanding of their commander's methods. The observation has been made that this point is not generally emphasized in the instruction at Leavenworth. Greater consideration of it would help newly detailed staff officers of the corps and division level in preparing themselves to fit more readily and more effectively into the tasks required of them in the field. An example of the variation in the employment of staff personnel as between two commanders of the same level is apparent in the division of functions between the Chief of Staff and Deputy Chief of Staff in the case of the II and an adjoining Corps. In the latter Corps, all tactical operations are the province of the Chief of Staff while the

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deputy assumes responsibility for all administrative, service, and supply matters. The reverse is true in the II Corps. Here the Deputy Chief of Staff has no administrative responsibilities but is charged with the supervision and coordination of all intelligence, liaison, planning, operations, and training functions of the Corps staff.

The organization of the staff by command post echelon is an important element in the relationship between the staff and combat operations. Under the old table of organization which provided a greater number of personnel, the staff of II Corps operated in three echelons: an advance command post which included the command and tactical operating elements with a small representation of the major supply sections; a supply echelon farther to the rear, containing the supply elements; and finally a rear administrative echelon with all the normal administrative sections. The recent reorganization of the Corps headquarters under the new table of organization reduced the personnel, especially in the strength of the headquarters company, and the servicing and maintenance of the three echelons became impracticable. As a result, the organization of the Corps staff by echelons has now developed into two echelons: an advance command post containing all the command, tactical, and operating elements plus essential supply and administrative representative such as the G-4, a small advance section of the Adjutant General's office, and representatives of the quartermaster, ordnance, and other operating supply and service sections; and a rear echelon containing the remainder of the headquarters. This grouping, in addition to reducing overhead, facilitates staff visits by placing the interested staff officers near their respective installations.

With respect to standing operating procedures within the headquarters and staff, II Corps uses a field-tested, brief but necessarily complete SOP and it is adequate and effective. Actually, after long experience, the staff sections have become so familiar with the SOP that the execution of its provisions has become automatic. It is now generally used as a reference and check list.

The scheduled conferences during an ordinary day are as follows:

0730-0800: Orientation of Section Chiefs and Liaison Officers on operations during the past twenty-four hours.

0830: General Staff Conference with Corps Commander to review the tactical situation and to initiate any orders or studies he considers necessary to influence the operation of the corps.

Above meeting is followed directly by a Conference of the General Staff, when necessary.

1130: Artillery-Air Target Conference to coordinate artillery interdiction and harassing targets with air targets for the next twenty-four hours and to insure that they are in accordance with the scheme of operation. Representatives from G-3, G-2, Corps Artillery, G-3 Air Officer, and Photo Interpreter and the Deputy Chief of Staff attend.

1700: General Staff Conference with Corps Commander for the same purposes as the morning conference.

1930: Liaison Conference held by the Deputy Chief of Staff with Corps Liaison Officers and any Section Chiefs who desire to attend. At this meeting, problems of liaison are brought up and the Corps Liaison Officers are oriented as to the probable course of action for the next forty-eight hours.

Simplification has been sought in the preparation of field and combat orders. Field orders initiating an action are published complete in form and annexes. They include the scheme of maneuver to include the accomplishment of the Corps missions and the preparations for continuing missions. All possible detail is stripped from the body of the Field Order itself and placed in the appropriate annexes. As the action progresses, use is made of orders issued verbally by the Corps Commander to Divisional Commanders. These are later confirmed in brief simplified orders reduced to the minimum of detail. It has been found more convenient to issue these in the form of numbered Operations Instructions or letter directives than

as formal Field Orders. The instructions normally contained in paragraphs 1, 4, and 5 are disseminated through situation reports and intelligence summaries as the information becomes available. This procedure saves considerable time in the issuance of orders and gives subordinate commanders and staff sections additional time for their preparations.

The outstanding general development resulting from the staff operations of II Corps has been the planning procedure that has been employed. A special planning group, composed of the Deputy Chief of Staff (tactical operations) and representatives of the general and appropriate special staff sections operates at all times necessary in the preparation of plans for future operations. The action of this group is designed to anticipate and prepare for any operations that may be required as a result of current combat and decisions of the Army Commander. Thus, while the Corps is engaged in current operations, the planning group of the staff is organized to produce detailed plans for probable operations that may follow. In this way it is possible for the Corps Commander to have readily available prepared and coordinated plans for use as soon as the decisions of the Army Commander are announced. These plans are quickly modified to fit the current situation. Then the G-3 puts the modified plan into operation and since the operating sections of the staff assisted in the preparation of the initial plan they can be quickly and easily oriented as to the line of action being adopted.

The actual functioning of this planning group may be of interest. The Corps Commander will generally call a conference of the planning group whenever the course of present operations indicates that future operations will probably develop along a certain line of action or direction. At this conference he announces that likely future operations will probably assume a certain course and directs that plans for such operations be prepared. After the staff has had the necessary time for study of the particular problems presented, the planning group and the general and special staffs gather with the Corps Commander, Chief of Staff, and Deputy Chief of Staff and review the means (troops and supplies) available to the Corps and the means of the enemy to oppose the Corps, and study the terrain over which the operation will occur. The G-3 then presents the possible lines of action open to the Corps and the G-2 counters each with what the enemy can do to oppose it. The problems to be met in each suggested plan as to means, time, supply, etc., are then discussed. The Corps Commander, after considering the advantages and disadvantages of each plan, then selects the line of action to be adopted and announces the basic operational plan in a directive to the staff. This directive is then presented to the planning group which jointly and individually works out the details of the basic operational plan. The basic operational plan is then announced to the members of the staff so that section plans and the necessary annexes can be prepared. The completed plan is then presented by the planning group to what is called the "Murder Board," consisting of the Commanding General, Chief of Staff, Deputy Chief of Staff, the G's, and all chiefs of special staff sections concerned, which makes any final revisions necessary. When these revisions are completed, the final plan is then ready for use. When detailed advance planning by subordinate units is necessary, pertinent parts of the plan are sent to these units for planning purposes as far ahead of time as possible. After this, the plan is held ready to be converted into orders by G-3 on short notice. The time generally required for the preparation of one of these operational plans, from the initial conference to the final action of the "Murder Board," averages from thirty-six to seventy-two hours, depending on the size of the operation, complications of details, and other factors. When necessary, the schedule of planning is streamlined to meet fast moving situations.

Long experience has clearly shown that in all planning, the prime necessity for contingent and alternate plans must be kept in mind at all times. Exact conditions, troop

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strength, organization, and other factors influencing the general situation cannot be predicted with complete certainty. Changes and new conditions inevitably occur during the course of combat. Therefore, in all general plans, full provision must be made through alternate or contingent plans to meet changes without disrupting the general effectiveness of the major plan adopted. A pertinent example of this was the "Itri Plan" drawn up by the Corps staff under the procedure above outlined prior to the offensive of 11 May 1944, in anticipation of the operation that captured Formia, Itri, and other adjacent objectives. This plan was supplemented in its preparation and adoption by the "Little Itri Plan" in order to meet certain possible changes in the troop list of the Corps. As it actually turned out, these changes did materialize, and the "Little Itri Plan," alternately prepared to cover such a contingency but embodying all the main points of the original plan, was successfully executed without complication or delay. As in the application of tactical doctrine and staff principles, the keynote of successful planning is flexibility as well as early and thorough consideration of all elements of the situation.

Another important development in staff functions and procedure has been the handling of movements and traffic control. In the earlier stages of the Italian campaign this subject was of special significance because of the limited and difficult road nets that had to be used. In the later period after the beginning of the May offensive its importance increased as a result of the rapidly moving situation. Within II Corps the standard procedure is for the G-3 to issue a brief movement order containing only a directive that the Corps or elements of the Corps will proceed from a given location to a given destination. The logistics, details, planning, and coordination of the movement are the province of the G-4. To carry out these detailed functions, there is set up within the G-4 section a special Traffic Control Center, composed of two officers and two enlisted assistants of the section. The "TCC," as it is called, conducts continuous road reconnaissance, coordinates the work of the Provost Marshal and Engineer with respect to movements and road conditioning, and carries on a study of routes with a view of eliminating bottlenecks. It maintains road graphs which record each main supply road and secondary route, showing the maximum density of traffic that the roads can bear. It also conducts study of traffic flow to determine traffic density over the road nets that will be available to the Corps in probable future movements. In any movement of the Corps the Traffic Control Center does the logistical planning, clears the movement of serials, and coordinates the work of the Provost Marshal in the physical control of the movement.

In short, the establishment of the Corps Traffic Control Center under the G-4 has resulted in an effective, centralized agency for the planning, coordination, and execution of all movements and traffic control within the Corps. One particular benefit that has been derived over periods of operation has been the accumulation and compilation of valuable statistics and data on road capacity and traffic density that have been extremely useful in logistical planning. It is felt that the movement control procedure and the establishment of the Traffic Control Center have been one of the main contributions to G-4 staff functions resulting from the experience of the Corps.

With regard to G-4 supply functions, several lessons have been apparent in the operations in Italy. In this campaign, both stabilized and rapidly moving situations were experienced. As a result, the following conclusions have been drawn. In a stabilized or non-moving situation, the supply system of direct flow from army to division on a centralized army basis works to excellent advantage. In changing situations, or rapidly moving situations, especially in pursuit operations, provision must be made to decentralize supply functions as necessary to the corps.

Within the G-3 section, no special developments have resulted, other than the planning procedure above discussed, in which the G-3

and members of his staff play a large part. It is customary for one member of the G-3 section to be assigned permanently to the planning group, in addition to other normal duties. Although closely coordinated with the G-2 section, the G-3 and his assistants operate in a separate installation from the G-2 within the Corps command post. In order that the G-2 and G-3 may not be unnecessarily interrupted by requests for information regarding the current situation, a War Room is maintained separately from the G-2 and G-3 sections, under the supervision of the Chemical Officer. All liaison officers and accredited visitors requiring information can obtain the necessary data on the situation from the War Room maps, which are posted currently with the G-2 and G-3 situation maps. A daily orientation meeting for all heads of staff sections and liaison officers within the Corps is also held each morning in the War Room.

Two main points have been brought out with respect to G-2 functions as a result of long combat experience. The first of these is the necessity for the continual two-way flow and exchange of information from upper and lower levels of command. Of special importance is the need for more rapid and thorough dissemination of information from higher to lower units, including such items as terrain studies and analyses, air photo intelligence, changes in enemy order of battle, and information of large enemy movements which may indicate impending changes in the nature of the coming situation. Such data are of vital importance down in the echelons which are carrying on the actual fighting. The second conclusion that can be drawn from G-2 experience is that accurate identification of the enemy order of battle and sound knowledge of the terrain in which he is operating are the kernel of G-2 intelligence. If these are obtained quickly and with accuracy and completeness, the enemy's capabilities can be assessed quite closely and his possible reactions deduced with satisfactory correctness and appropriate countermeasures can be taken. In this connection, the value of information from civilians when operations are conducted under the circumstances such as have prevailed in Italy should not be overlooked. Our experience has been that information obtained from local civilians has been both accurate and of real value, especially with respect to terrain, routes, defenses, and enemy-held ground.

From the G-1 point of view, one development in the supply and processing of infantry replacements has stood out as an excellent lesson. Although this experience concerns the G-1 functions of the divisions and the army more than the corps, it should be mentioned as of interest to all higher staffs. The development originated in a system adopted by Fifth Army with the cooperation of the theater replacement system. At the beginning of a major operation, each infantry division has been given a special allotment of forty-two company grade officers and 750 men over and above the normal table strength. They have been placed under limited division control for training, orientation, and for immediate replacement of casualties. These replacements have constituted a divisional pool, which is refilled from the depots in the rear as its strength is drained into the line. The system has a number of advantages. First and foremost, it has kept the fighting units up to strength. Also, the new men have had, under divisional control, a measure of training under officers with whom they later serve in combat. It has largely obviated the delay between routine requisitions and the arrival of the replacements from the depots, and it has made possible a more gradual breaking-in of the individual replacement before he is assigned to a front-line unit. Another advantage has been the stimulating morale factor. By being first assigned to the division pool, the individual soldier soon acquires the sense of "belonging to an outfit" before he actually joins his unit in the line. This has been of material benefit. Generally speaking, this system has been regarded by a number of division commanders as one of the best developments from the personnel aspect that the Italian campaign has produced. Reflecting the general favorable opinion that the system has elicited, the Commanding General of the 88th Infantry Divi-

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sion declared during the May offensive that "the result of this replacement system has been that today (May 30), after some eighty days in the line, my division is at full strength, and with all the new men trained in some degree under division supervision and by officers of units in which they have been committed to combat." Within the Corps, the effective results of this have been felt and the II Corps staff believes that such an excellent system should be continued and expanded.

Much emphasis is placed in the II Corps upon the selection and progressive training of the Corps Liaison Officers. Even in combat there is a daily period devoted to the study of the problem of liaison and to the best manner of obtaining the information required by the operating staff sections of the Corps staff.

The II Corps staff has also found that there is no substitute for frequent staff visits. It is only by constant checking, and frequent visits to all Corps units that troubles can be anticipated and remedial action taken before a serious situation develops.

Such have been the high points of staff experience within II Corps. They are passed on to the staffs of other similar organizations as of possible benefit and interest. Three major campaigns have shown clearly how close the relationship must be between the staff functions and tactical operations. Everything that can be learned to improve the former will help to improve the latter. Campaigns are not won by either staff functions or combat operations alone. An efficient, coordinated, and working union of the two is required for success.

RAF "Heavies" Go Tactical

From a British source.

AIR warfare history was made on 18 July 1944 when the RAF "heavies," which for nearly four years have been used as night bombers only, smashed the German defenses at Caen in daylight in a devastating forty-minute attack in which more than 1,000 bombers dropped 5,000 tons of bombs.

In this attack, several new departures were made from the established role of the British "heavies." These innovations were:

1. The use for the first time of more than 1,000 RAF heavy bombers in daylight.

2. The bombing of German troops and battle equipment within a few yards of our own troops by such a large force.

3. The variety of fuses used to make the right sort of craters so that terrain over which Allied tanks were to advance immediately after the attack would not be rendered impassable.

These innovations seem to have caught the Germans by surprise. Everything points to the enemy having underestimated the possible power of close support by heavy bombers. Indications are that they expected this close support of ground troops to be given by small aircraft of the fighter-bomber type.

Another factor which must have been overlooked by the Germans was the ability of the heavies, as a result of years of night precision bombing experience, to take on targets on the battlefield without endangering the lives of the adjacent British troops.

The size of this forty-minute, 5,000-ton attack may be gauged by the fact that this weight of bombs is nearly as great as that dropped by the Luftwaffe on Britain during the whole of last year and the year before, and it is twenty times the tonnage the Germans dropped during the notorious Coventry raid.

In military terms, it would have taken the field artillery of sixteen British divisions plus four hundred 155-mm guns to have put down a comparable barrage in the same short space of time.

Qualities of a Good Staff Officer

MAJOR GENERAL PHILIP HAYES, *United States Army*
Commanding General, Third Service Command

THIS war is different from any other war. It is, so to speak, the first war of depth. All other wars have been linear wars, more or less, but there is no limit to the depth in which we are fighting today because time and space have all but disappeared. Staff officers have to face this fact. Things are happening much more rapidly in this war than in the last, and a staff officer has to arrive at a solution quickly and put it into effect. Decisions must be made, and there is no time to spend in seeking *ideal* solutions; things happen too fast.

To be able to fill the position of a staff officer properly, a man must guard against acquiring or must eliminate from his personality and character traits certain undesirable qualities. Also, he must possess or acquire a number of elements without which he may not be considered a good staff officer.

There are three qualities which are entirely undesirable in a staff officer. The first, and perhaps the worst trait a staff officer may possess, is that of being a "yes" man. No commanding general wants a "yes" man around him. What value has a man who says, "I wonder what the Commanding Officer wants me to say?" None. If, however, he says to himself, "I wonder what the old man wants?" and tries to work out the answer, then he has possibilities. A staff officer is there to assist his Commanding Officer, to carry out the details, to advise him.

The second undesirable trait is that of being a "no can do" staff officer. If there is anything that annoys a commander, it is to have a staff officer appear and say that this can't be done and that can't be done. There are a thousand reasons why a thing cannot be done; what the commanding officer wants is one reason why something *can* be done. A staff officer should not go in to his commander and say that the commanding general can't do it; he should find a solution. That is assistance.

Third, the most undesirable quality a staff officer may have is disloyalty. No man can be what we consider a soldier and be disloyal. By the same token it is incumbent upon the staff officer that in himself he guard against any disloyalty to his commanding officer. Once a decision has been made, the staff officer carries out the decision wholeheartedly and loyally. That is fundamental.

And now, what qualities constitute a good staff officer? First of all he is a soldier, which means that he possesses the five elements necessary in a good soldier: the determination and the will to do and to win; sound, complete training; good discipline; physical fitness; and loyalty. If one of these elements is lacking, the result is not a good soldier.

Being a good soldier, the good staff officer also needs knowledge, tact, diplomacy, common sense, and good judgment.

A staff officer works in three planes: he plans for the future, he executes in the present, and he follows up on the past. Of these three the most difficult is "to follow up." We humans are so made up that we project ourselves into the future, and once the future materializes we go forward again. We forget what is happening behind us. Staff officers, then, should not think that a job is accomplished merely because an order is issued. It is necessary to follow up on it. If a staff officer is a one-man section, he must himself plan for the future, execute, and follow up. If there is more than one man in the section, it will be necessary to organize, coordinate, and follow up on the plan.

The clever commander knows that one of the best ways of disposing of problems inherent in certain staff sections is to air them informally, to utilize informal association at staff conferences. Unconsciously one and another tell their problems. Something that sounds rather difficult to one officer turns out to be no problem at all because Jones over there solved it this way, and the staff officer learns how Jones solved it. The important thing for a staff officer to remember is that at these conferences he must *give*, give his problems to the group and give his assistance

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to others' problems. Too often officers are assembled, the group waits to hear the various problems and offer assistance, and there the officers sit not saying a word. A staff officer cannot get anything out of such a conference unless he puts something in. All have a common purpose, to win the war. The problem of one is not his alone but belongs to the group—even more—to the Army as a whole, for it influences one phase of the conduct of the war. So each staff officer, when he comes away from a conference, should be sure that he has given all he can to it.

Many times an officer will leave a staff conference without having cleared up in his own mind some point which was made. Invariably when this happens the first thing that comes up in his section is the point which he did not understand. If there is anything the staff officer does not clearly comprehend, he should ask a question. Never should a staff officer leave a conference if there is any point which in his mind is doubtful.

One other thing which should be the concern of all officers on a staff is report writing. All staff officers are going to experience being asked to present a report by a certain specified time a few hours hence, and each at some time or other will say to himself that it cannot be done. But it *can* be done and it *will* be done—not an *ideal* solution, but a solution, and that is what is required. Reports should only be made as long as is definitely necessary to present the required information. Anyone can write a long report, but who has the time to read it, to ferret out the important points hidden in a mass of verbiage? To write a concise, complete report takes energy and perspiration on the part of the individual, but it saves time for the group. Extra hours are well spent by a staff officer if they save extra hours for the whole staff. No more should be written than is absolutely necessary for a complete report.

Sooner or later the staff officer passes from the "staff" stage to the "command" stage, and it then becomes necessary for him to have certain additional qualities.

As a commander, how is he going to use his staff officers? What is important from the commander's viewpoint? One thing uppermost is always to have the ability to give the man a job, tell him what is wanted—the results, the objectives—and then let him alone. *Let him alone.* Too many commanding officers hover over their staff officers asking, "How about this? How about that? How about the other thing?" Inside, each of his staff officers cannot help a little feeling of resentment; and probably each one says to himself, "I can do this job. I know what is to be done, if he would only let me alone." When the staff officer becomes a commander, then, he should remember to give a man a job, give him the tools with which to work it out, and let him alone; then when the staff officer wants assistance and advice, give it to him. This is fundamental.

Another thing necessary in command, particularly from the Army Service Forces viewpoint, is the ability to decentralize. It is not feasible or possible to keep everything to oneself, for things are happening too rapidly; there are too many details for the commanding officer to handle them alone. He must decentralize them downward. On any particular problem, the commanding officer picks the staff officer whom he wants to handle it and does not try to handle it himself. Many a commander has lost out in the last two years because he tried to do too much himself. He was afraid, possibly because he was not sure he could pick the right man to do the job or because he knew he was responsible for the outcome and feared it would not be right otherwise. The commanding officer cannot, of course, delegate the responsibility, but he can delegate certain phases of his job to be done for him; so he chooses a staff officer to do certain things. If the staff officer does not come through, all right; he did his best. Next time he probably will come through and he should not be thrown aside immediately just because things are happening too rapidly. What used to be done in two weeks is now being done in two hours. The commander must realize that and take it into consideration. It is all important.

Let us summarize our important points. First, the undesirable qualities of a staff of-

ficer: Don't be a "yes" man—assist, advise, carry out the details. Don't be a "no can do" officer—work it out, find a reason why it can be done, get a solution. Don't be disloyal—once the decision has been made by the commanding officer, give it your wholehearted and loyal support.

A good staff officer is a good soldier—he has the determination and the will to do and to win; he is well trained, well disciplined, physically fit, and loyal. In addition, he possesses knowledge, tact, diplomacy, common sense, and good judgment.

In his work the staff officer plans for the future, executes in the present, and follows up on the past. He gives willingly and freely of his time and talents for the benefit of the whole. In a conference, he brings out his own problems and offers helpful advice to other staff members.

On passing to the command stage, a staff officer must evince certain other qualities. He must be able to give an officer on his staff a job, tell him what is required, and then let him alone to do the job. He must be able to decentralize his work downward.

An officer who avoids the undesirable characteristics and develops the good qualities mentioned here will be a good staff officer.

German "S" Mines

From a British source.

THE following is an extract from a report by an officer who recently visited the Eighth Army:

"I had been given to understand that if you stepped on an antipersonnel mine, the only thing to do was to hold the foot down, lean well back, accept the fact that the foot might be blown off, but hope that the mine would not explode above ground level. Eighth Army engineers who had had a good deal of experience of S mines told me that though this idea had been current for some time, it was quite erroneous.

"The antipersonnel mine has a delay of three or four seconds. When you step on it, there is a muffled click in the ground. Between three and four seconds after this click—that is, after the cap has fired—the cylinder blows four or five feet into the air. The cylinder seldom rises vertically on its axis, but generally takes a tilt to one side or another. The splinters from the underside of the cylinder strike the ground about three yards from the position of the mine; those from the upper side fly in the air three or four feet clear of the ground. The base is usually blown downwards close to the original position of the mine.

"The conclusion these sappers had come to was that it is probably best to move three or four yards away from the mine and lie down. Even though three seconds is quite a long delay, and a man lying flat on the ground twenty yards away is not likely to be hit either by the splinters or by the steel balls that fly out of the cylinder, running any distance is not recommended. The enemy has a habit of laying mines in clusters, and a man running from one mine is quite likely to step on another without knowing it, and may drop down beside it or even on top of it. He may, of course, do the same even if he moves away only a short distance from the first click, but the risk is preferable to leaving the foot on the mine.

"Sometimes, too, the Germans put down mines that have no delay action. These jump straight out of the ground and allow no time for any action to be taken.

"In general, therefore, no definite 'IA' can be taught. Treat S mines with common-sense respect; walk on tip-toe, and remember that the faster the pace, the safer a man is; and that the longer the pace, the less chance there is of a mine being detonated."

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The Second Phase of the Invasion of France

COLONEL CONRAD H. LANZA

NOTE: This article is based upon the latest information which is available at date of writing and which is not confidential.—THE AUTHOR.

THE invasion of Normandy was discussed in the September number of this magazine. It will be recollected that the Allies, under General Sir Bernard L. Montgomery, landed in Normandy on 6 June last. With the First U. S. Army on the right, and the Second British Army on the left, by 10 July this force, constituting together the 21st Allied Army Group, had secured a beachhead over sixty miles long, including all of the Cotentin Peninsula. At the north end of this peninsula was the large and important port of Cherbourg. Due to demolitions caused by the enemy, this port was not functioning. Supplies were brought over open beaches. The depth of the beachhead east of the Cotentin Peninsula varied from ten miles at the east end to as much as twenty miles opposite St. Lo.

THE ALLIED MISSION

The mission was to drive back the opposing enemy, destroy him if possible, and in any case to secure maneuvering space for open warfare. There were two possibilities.

A break through the enemy's lines at the east end would place the Allies on the short road to Paris, and closer to the enemy's bases than his own forces. If successfully developed, this maneuver would tend to force the enemy's army to the west, where it might be pinned against the Atlantic Ocean and annihilated. A variation would be to penetrate the enemy's lines west of the east end, which was strongly anchored about the town of Caen. In this case, that part of the enemy forces which lay to the west of the penetration would be cut off, while the fraction to the east might retire towards Paris fighting a delaying action.

The second method was to break through at the west end along or near the west coast of the Cotentin Peninsula. If this succeeded, it would at once give access to the peninsula of Brittany. This had an excellent port at Brest, and a very good port at St. Nazaire. There were secondary ports at St. Malo on the north side and at Lorient on the south side. On account of the supply situation, additional ports for the rapidly growing Allied armies were desired. Besides, bad weather could be expected to arrive at the end of September, after which landing of replacements and supplies over open beaches would be liable to frequent interruptions. It was very desirable that new ports should be acquired sufficiently in advance of this date to enable them to be reconditioned and open for business before the autumn equinox.

A breakthrough on the west flank would not cut off the enemy's main army, but it would afford a possibility of undertaking an encircling movement with motorized forces which, circling around the enemy's rear areas, would force the enemy's main force to retire. Under favorable circumstances such a movement might even reach the enemy's line of communications and result in the destruction of his whole force.

THE GERMAN MISSION

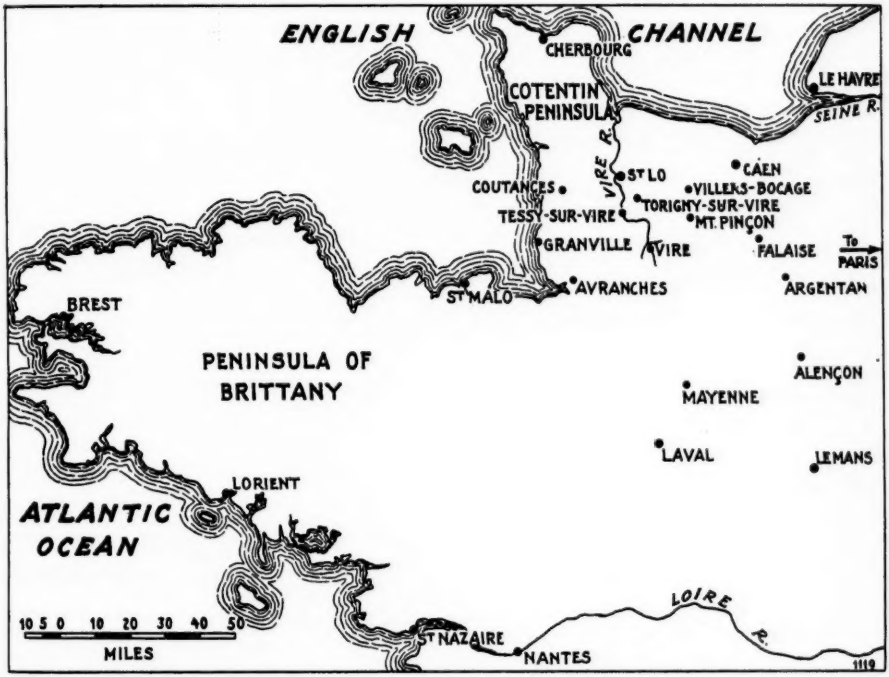
The German Seventh Army was opposing the Norman beachhead. According to our G-2 estimates, it contained at the end of the first half of July between twenty and twenty-five divisions. Of these, eight were panzer divisions, one was a panzer grenadier division, six were SS divisions and over strength, and five to ten were infantry divisions, which may have been below strength.

The German Fifteenth Army, estimated at fifteen divisions, was covering the coast from the Seine to the Rhine. The Germans believed that the Allies had about forty divisions already landed in Normandy, and that forty to fifty others were still in Britain and might land in some other sector, particularly in the area of their Fifteenth Army. They did not, therefore, desire to weaken this army at this time.

The German First and Nineteenth Armies were in southwest and southeast France.

Their strength combined was estimated by the Allies as not over twelve to fifteen divisions. In all, the four German armies had forty-seven to fifty-five divisions. The total German strength was reported as having been sixty-five divisions, which would be sixty-one deducting four divisions lost at Cherbourg. The German reserve seemed, therefore, to be six to fourteen divisions, probably around ten.

The German plan was to wait until the Allies had engaged nearly all of their available divisions, making it improbable that invasions would occur at other places. Then the Germans would concentrate according to the situation and endeavor to destroy the invaders, or at least confine them to a constricted beachhead. The role of the German Seventh Army was for the present a delaying one pending a full deployment of the Allied armies, wherever that might be.



The British Attack on Caen

On 9 July a major offensive was launched with a view of breaking through in a southeasterly direction through Caen. An exceedingly intense air and artillery preparation was laid down prior to dawn. Caen was within ten miles of the coast, and the Allied navies participated in the artillery preparation with their heavy batteries. The ensuing attack by infantry and tanks secured the greater part of Caen, but there was no breakthrough. On 10 July the attack was exploited to the flanks with minor gains.

On 18 July that offensive was renewed. As before, there was an air preparation followed by an artillery preparation. It was even stronger than before and lasted until noon, when the infantry and tanks attacked. The tanks stayed with the infantry, as the result of experience. This battle followed the lines of the one a week earlier. The British

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center advanced a limited distance and was then stopped. As before, exploitations to the flanks were made on the next day. However, it was impossible to get the center forward.

Once more a week passed, and the attack was renewed on 25 July. This time the air and artillery preparation started at 11:00 PM, and the infantry and tanks jointly jumped off at 3:30 AM in pitch darkness. The results were the same as before—a moderate advance in the center, with impossibility of getting it started again.

These three battles were on the same plan except that the hour of the infantry attack was respectively dawn, post-dawn, and predawn, the hours of the artillery and air preparations being correspondingly adjusted. There had been so much previous shelling and bombing in the area that the terrain had been reduced to rubble, ruins, craters, and shell holes. Not a town remained. Trees were gone or dead. Unburied bodies were everywhere. The roads were such a mass of holes that none could be used. Typical stabilized warfare battles.

The American Attack

Between 10 and 25 July the First U. S. Army made a succession of attacks with limited objectives which gradually pushed the line southwards. In two weeks the gain varied from two to five miles in various sectors, despite continuous and severe fighting.

According to reports from Allied Supreme Headquarters, in view of the British check around Caen and the slow American advance a conference was held of the senior generals, including General Eisenhower, Commander in Chief, and Generals Bradley, Dempsey, and Montgomery. Generals Bradley and Dempsey at the time commanded the American and British armies respectively. According to an interview subsequently given by one of the participants, the conference agreed upon a new plan, which was to break through on the west and rush armored troops in great strength through the gap with the mission of fanning out as soon as the enemy's rear areas were reached. Large reinforcements of new divisions, including armored ones, were arriving and due to arrive, and were available for the plan. The date of this decision has not been made public. It appears to have been about 20 July.

The American attack was delivered on 25 July, the same day as that of the British attack, and was directed southwest through St. Lo. The air and artillery preparation started at dawn with the infantry and tank attack at 11:00 AM. The maximum gain was one and a half miles. The attack was continued on the 26th, using four infantry divisions and strong artillery support. The 2d and 3d Armored Divisions spearheaded the attack. They were given unusually strong accompanying air forces. The armored troops went straight down the roads, bypassing enemy centers of resistance, which were left to the following infantry divisions. At the end of the day, gains up to six miles had been made, notwithstanding that three columns of armored troops had no lateral liaison with each other.

This American attack was continued in the same manner and in the same direction on succeeding days. By the 29th, fourth day of the armored advance, a twelve-mile-deep salient had been driven from St. Lo to the vicinity of Coutances, which the enemy, seeing the possibility of his being cut off, commenced to evacuate.

The greatest advance to date was made on 30 July, when the 3d Armored Division advanced twelve miles to reach Avranches, while the 2d Armored Division reached the vicinity of Granville. This movement cut off numerous German troops in the area about Coutances. Due to the infantry divisions following the armor being a considerable distance in rear and occupied with reducing bypassed hostile elements, the Germans managed to escape from Coutances but not without loss.

The Results of the Breakthrough

As July closed, the Americans had at Avranches broken through the German defense line. There was no organized position beyond, and open warfare was now possible.

At this time a reorganization of the Al-

lied forces, due to large new reinforcements being available, was made. The Commander in Chief, General Eisenhower, transferred GHQ from England to Normandy. The First U. S. Army was relieved from duty with the 21st Army Group and assigned to a new 12th Army Group, to which was added the newly joined Third U. S. Army under Lieutenant General Patton. The First Canadian Army, also newly joined under Lieutenant General Crear, was assigned to the 21st Army Group and took over the left of the line. Lieutenant General Bradley assumed command of the 12th Army Group, and was succeeded in command of the First Army, which took over the left of the Army Group, by Lieutenant General Hodges.

The German reaction was to organize an armored group in the vicinity of Vire, with the mission of attacking westwardly to the coast and thereby cutting off the American forces at Avranches. To accomplish this it was necessary to transfer panzer divisions from the vicinity of Caen.

On 2 August the Third U. S. Army undertook two movements of exploitation. The Sixth Armored Division was sent westwards from the Avranches area into Brittany to initiate the movement to secure the much needed extra ports.

The bulk of the American armor was ordered south. After gaining sufficient maneuvering space it was to turn eastwards, well in rear of the enemy's Seventh Army. The latter would be held by continuous attacks by the three armies not engaged in the turning maneuver. All armored forces were to be followed as rapidly as possible by motorized infantry divisions.

The American armor went south fifty miles without meeting any substantial resistance. On 5 August it turned eastwards and met the enemy on the line Mayenne—Laval. On the same day the First U. S. Army and Second British Army attacked southwards along the line Tessy-sur-Vire—Torigny-sur-Vire—Villers Bocage with main effort towards Vire, as the assembling of strong hostile forces south of there had been noted.

A series of three separate battles now followed.

In the south the attack of the Third U. S. Army failed on the 5th. Using the high mobility of the troops, the enemy's left flank was turned on the 6th, and his troops thereupon fell back to the line Alençon—Le Mans. The new German line was attacked on the 7th, with main effort as before on the south flank. By a turning movement, Le Mans was taken on the 9th. By this time the Third Army had ten American divisions in line, and had recalled its 6th Armored Division previously sent into Brittany. Still pushing with its right, it advanced eastwards about ten miles on 10 August. Then discontinuing this movement on 11 August, the armored divisions, carrying supplemental infantry on the outside of combat vehicles, turned north. Passing in rear of the enemy's position, which was facing west, the Americans reached and attacked Alençon. Coupled with a frontal attack, that place fell. Leaving it to the infantry division, which had been in the frontal attack, the armored troops pushed on to the vicinity of Argentan. The enemy thereupon abandoned his entire position at and south of Alençon and retreated to the east.

In the meantime, the Allied attack of their main forces made slow but steady progress. Fighting daily against severe opposition, the line was advanced to the vicinity of Vire—Mt. Pinçon. On the 10th the attack was extended by the First Canadian Army along the axis Caen—Falaise.

The third battle was started on 7 August by the Germans, who, after having concentrated five panzer divisions south of Vire, attacked westwards. This attack gained as much as four miles, but it never had a chance to reach the coast. The German armor lost heavily from rocket planes. Notwithstanding some success, when on 11 August the Canadians were approaching Falaise on the north and the Americans Argentan on the south, two places only twelve miles apart, the German Seventh Army ordered their offensive discontinued and directed the withdrawal of their troops, now largely at the west end, to east of the Falaise—Argentan line.

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Minor Results

Brittany as a whole was not defended by the Germans. It was occupied by the Allies during the first week of August. The Germans did elect to defend the ports in order to deprive the Allies of their use for a greater length of time than mere demolition would have caused. The ports held were Brest, where the garrison is reported to consist of three or four divisions; and St. Malo, Lorient, and St. Nazaire, where the garrisons are reported to consist of SOS troops and miscellaneous detachments, improvised into provisional field forces.

The German Strategical Plan

A new German chief of staff was appointed on 20 July—Colonel General Guderian, vice Keitel, relieved. Guderian promptly reversed the decision of his predecessor and decided to reinforce his troops on the Russian front, in part by withdrawing troops from France and elsewhere. Initial orders appear to have been issued on 22 July.

This change resulted in the abandonment of any idea of a large-scale offensive in France. A number of divisions were withdrawn. It seems to have been about ten. Orders to prepare to evacuate France were given.

At the end of July, all families and all non-essential civilians were about out. Movements of troops were reported on 3 August, when Spain noted that the German troops on her frontier were practically gone.

Other details of the German withdrawal during the period covered by this paper, which ends with 11 August, have not been ascertained.

Bullocks as Pack Animals

From "Notes from India" in *The Fighting Forces* (Great Britain) June 1944.

THE first pack bullock company to be seen in India was "invented" and put through a successful battle course by the West African Force. It will ultimately proceed to the forward battle areas in Burma. The bullocks' performance under the most arduous conditions shows them to be almost as surefooted as the more famous mules and to be capable of carrying far heavier loads.

A Service Corps officer was given a dozen bullocks with which to carry out preliminary tests. Specially bred in the Southern Punjab for Service Corps bullock-cart transport, the animals, magnificent 15-cwt snow-white beasts, went through all battle-course tests with their tails up. "Thunder flashes" were exploded near them, gas rattles and raid sirens were sounded, red flags were literally waved in front of them, they went on long night marches over rough hilly country loaded with 200 pounds of supplies, they swam rivers and "tightroped" narrow, specially built brick walls. There was not a single mishap.

Each African soldier has his own bullock for which he is responsible. The Africans were obviously taking a pride in their charges and have given them many African names. Some were a little nervous of them at first, particularly in the very early stages when the bullocks had to be persuaded that their loads were to be carried on their sides in packs and not on carts behind them. Some of them tried bucking and rearing to shake off the strange loads. There were occasional tossings, and to prevent this two inches were sawn off the horns. But they are battle-worthy today, and when they become front-line cattle each will plod its way up the line with its regimental number branded on its horns.

There is a postscript to this story. With all, except two, pure white, a serious camouflage problem has presented itself. So each bullock, before it leaves for the jungle, will be dyed with coffee.

Carrier Air Support of Assault Landings

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The author has had extensive experience in the operation of U. S. Carrier Task Forces. He was serving as Chief of Staff to Admiral William F. Halsey in the Pacific when war broke out. He continued in this duty until mid-1943, when he was assigned to command the U. S. Carrier Hornet. He reported to the Command and General Staff School from that assignment in July 1944.—THE EDITOR.

THE interdependence of land, sea, and air power and their mutually supporting roles have been spotlighted in World War II with clarity and forcefulness. It is to be confidently hoped that we have seen the last of the unbalanced concepts which featured the partisan controversies which took place before Mars had blown away the fog and cleared the atmosphere. Now it is recognized that GI Joe, the tank, the gun, the battleship, the submarine, and the airplane, each furnishes *support* to the military effort as a whole. At one stage or another of any major campaign, one of these will carry the ball—it is a waste of time and encourages distortion of facts to argue *which* won the campaign—they all did.

This is the underpinning of a sound understanding of "air support." Pantelleria was seized by ground troops—but air support had beaten it to its knees and there was no ground fighting involved—air carried the ball. Tarawa, on the other hand, although badly mauled by heavy naval gunfire and air attack, fell only after practically every Japanese on it had been routed out of his hole by ground action, most of it hand to hand. Infantry carried the ball. The surface fleet has carried it in many of our Pacific actions during the earlier months of the war; the submarine has done so—and magnificently—in the Western Pacific against Japan. The role of each, in proper perspective, is *support*—support of the military effort.

Air support can be more quickly materialized at any given point—and more quickly shifted as desired—than any other impact with the possible exception of psychological support—propaganda. Air can go into enemy territory and bring back necessary information on which to proceed with an assault or to direct a campaign. And air can strike where no other material weapon can reach. In these lie its great power and its vital contribution. It is the function of air support of *any* operation to exploit these faculties to the limit of practicability in furthering that operation.

Air support has become an indispensable feature of any offensive move. It has two forms: strategic and tactical. These may also be called, respectively, indirect and direct, or distant and close. Every military action in any theater has some impact on every contemporary or subsequent action in that theater; it is thus impracticable to tag with accuracy all air operations which fall in their entirety within the scope of strategic air support of any specific move. Diversionary support to other sectors is an incidental accompaniment of any positive military move in one sector. This is just as true in the air as on the ground or at sea.

Air support of assault landings—both strategic and tactical—may be provided by any combatant air agency within effective range. It runs the gamut of operations—reconnaissance both visual and photo, bombing of every kind, strafing, artillery observation and control, combat and antisubmarine patrols, rescue and transportation service—in short, any or all forms of aircraft activities may be included. Shore-based air may undertake any of these missions—depending on its availability in the theater. Water-based air is likewise suitable. Each of these agencies, however, has certain conditioning factors which go far toward determining the degree of their use in each phase. Long-range and repeated bombing of enemy bases during a preparatory period is obviously a task

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for which shore-based bombardment is best adapted. Similarly, long-range reconnaissance of points or areas which must be kept under frequent scrutiny is most effectively handled by shore-based air. Intensified strikes against strongly defended points at great range are tasks for which aircraft carrier striking groups are admirably fitted. This is currently a major and regular feature of their employment in the Western Pacific. All the above are examples of strategic air support.

In the field of tactical support at the actual scene of the assault landing, necessity for split-second timing introduces factors which are not present in the conduct of more remote missions. In covering landings, strikes must be on schedules which fit the sequence of landing operations; smoke—if used—must be laid exactly, both as to time and place; reports of observed enemy action and movement must reach combat unit commands directly and instantly. In ensuing operations ashore, call strikes must be available without the delay incident to their operation from remote airfields. The combat patrol cover which is provided for both the assault and support shipping, and the landing forces themselves, must be maintained continuously during daylight hours; indeed it may well be similarly required in darkness. These and other similar considerations favor strongly the use of ship-based air for direct tactical air support where friendly airdromes are not in the immediate vicinity. The all-important factor here lies in the ability of ship-based air to take its operating bases with it, right to the spot.

These are some of the basic reasons for the fact that the current landings in the Western Mandate Islands, as well as the earlier seizures of the Gilberts and the Marshalls, provide classic examples of joint air support of joint overseas assault landings. In every one of them, strategic air support has commenced weeks before the landing. This has taken the form of long-range bombing and reconnaissance into the area, by shore-based air; one or more carrier force raids; then the approach of the expedition itself, covered by strong carrier forces and accompanied by carrier-based air patrols; a very heavy air and gunfire preparatory period at the objective; and, finally, the landing and seizure with direct tactical air support from the fleet just off shore.

The Pacific, as mentioned above, provides classic illustrations of this pattern. But the exact similarity of direct air support of landings, *no matter what agency furnishes it*, may be readily seen where the European landings are compared with those in the Pacific campaign. When Italy was invaded, tactical air support of our landings was based on the fields in Sicily which we had recently seized. When France was invaded, airdromes in southern England served as bases for this support. In our landings in the Mariana Islands, no Allied land airdromes existed near enough to Guam and Saipan—hence, carriers furnished the close air support. The parallel is clear—for the invasion of Italy, France, and the Marianas, Sicilian airdromes, southern England airdromes, and U. S. carriers, each, respectively, furnished the *air bases close to the objective*, without which adequate tactical air support cannot be provided. *The air bases must be right there on the spot.*

Due to the topography of the theater, the advance against Japan may be expected to afford continuing examples of this use of carriers in providing much of the air support for our offensive. In the majority of cases, the bulk of the tactical air support will necessarily be drawn from them. The degree to which they will provide *strategic* support will depend mainly on the range of the particular objective from our own shore air bases; but it will feature to some degree every step we take.

Strategic support in the form of carrier force strikes prior to a landing makes little demand on the army staff planner. Familiar and excellent examples are the raids on the Marshalls prior to the seizure of Tarawa and Makin, and the strikes at Palau, Woleai, and Yap before the landings at Hollandia. Coordination required is at a minimum and is usually limited to adequate mutual exchange of intelligence, measures to insure

against *chance* contacts between shore-based air and elements of the fleet during approach and retirement, and non-interference in the target area. If possibility of fleet action is deemed to exist (as is usually the case) plans should include coordination of shore-based air and fleet attack on the enemy forces.

Coordination and detailed joint planning for direct air support at the objective during the assault are horses of a different color. Schedules for strikes and patrols must be worked out in minute detail, weeks—months if possible—in advance; support air control personnel selected, organized, and *rehearsed in full dress;* and the completed plans and schedules, amended as dictated by rehearsals, distributed to every command that is or may be concerned. Fleet carriers will seldom be available themselves for participation in rehearsals, but they will be represented by personnel intimately familiar with their capabilities and their requirements. Every feature of the carrier operations which are desired must be examined as to feasibility, mutually determined, and included in these advance plans.

The following typical operations are involved in direct air support:

Strikes on schedule.
Strikes on call.
Smoke on schedule or on call.
Combat patrols.
Antisubmarine patrols.
Tactical reconnaissance and observation.
Gunfire spot and artillery observation.

This list is not necessarily a complete catalog since every landing presents peculiarities requiring special missions; it does, however, cover the field of typical tactical air support.

While these missions are being provided at the objective, the carrier task groups themselves require close cover of their own in the form of local combat and antisubmarine patrols. Furthermore, they must keep moving —not only to permit air operation from their decks, but also, and more important, to provide security. In addition to maintaining speed through the water, they must be constantly changing the local water area in which they operate. When under attack, carrier task forces *must* be free to maneuver —and plane operations are interrupted. These are a few of the tactical factors which condition the detailed plans for their use. There are also material factors in the ships themselves, and in their planes, which have a similar influence. The bomb, rocket, and ammunition stowage and supply chains on the carriers are limited in capacity and must be operated in accordance with advance planning. A change from one type of bomb or fuze to another to meet some sudden contingency presents difficulties far more serious than on shore. Launchings and landings must be according to schedules—the ship's deck is only one tiny field and there is practically no parking stand or dispersal area. You can land or launch flights, but not both at the same time. A considerable period must elapse between recovery of one flight and launching of another. Last-minute changes in composition and armament of flights result in fatal delays and complete loss of flexibility in the carrier decks.

The "call" missions present one highly important and interesting feature of their operations, however, and of course, in many ways, are the heart of the problem of direct air support. The essence of the "call strike" is instant availability and flexibility. It must be on tap. That is why they cannot be furnished from land-fields in back areas; if you try to keep them in the air at the objective your logistics become fantastic; if you try to launch them from such bases on call they are far too late. This latter factor applies to carriers on the spot also; but the logistics factor does not—it is only a matter of a few minutes flight between carriers and objective, and call strikes from carriers are easily maintained in the air throughout the assault and the following critical period. They present the same problem and are solved in the same manner as the combat and antisub patrols in the landing area. The only difference lies in the bomb and rocket loads carried by the strike flights—these are selected for ground attack.

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Perhaps the most interesting feature of direct air support lies in the solution of the problem of control of the multitude of flights involved and the simplification of traffic and communications in the control area. The system resembles nothing so much as the control employed at and around a major airfield. The control area, roughly centered at the objective, constitutes a column of air within which every airplane and flight is under direct close operational control of a central agency while in that area. This agency is normally called the Support Air Control, or the Commander Support Air. Strikes, combat and other patrols, observation and reconnaissance flights, troop carriers, *all* pass under this control at the boundary of the control area. They may be diverted, delayed or expedited by this agency. They may be assigned an altitude, an area or sector, and a traffic pattern to be adhered to. An initial point or initial points may be prescribed, through which arriving flights pass and, upon passage, report in; or this may be required only upon passing into the area at any point in its perimeter. Use of rally points for outgoing flights is similarly controlled, but in every case of entry and departure, control receives direct report.

Control is exercised through certain specialized control agencies; typically, the following:

Control of strikes, either scheduled or on call, through the Strike Coordinator who is airborne over the objective.

Control of combat air patrols through fighter director groups.

Control of antisubmarine patrols through the parent vessels furnishing them, or the surface unit being covered.

Control of target observers and miscellaneous or special flights, direct.

In addition, through air liaison parties with each combat command ashore and afloat, flow of information and intelligence into Support Air Control is direct. Direct communication with call strikes by units requesting and/or receiving their support is accomplished through this air liaison net.

The "fog of battle" is markedly present at the height of an assault landing—and the parallel between organization and functions of Support Air Control and the control system at a major air base in low visibility is particularly apt.

No consideration of tactical air support of landings, no matter how abridged, is complete without mention of the imperative need for intensive study and thorough familiarization, on the part of every flight crew, with the plans and with the objective. Without it, precision in support is impossible; without precision, disaster is inevitable. Every flight crew must be familiar with every detail of the ground, the naval, and the air plans; must be intimately familiar with the details of the terrain and the surrounding water area and with the grids, the gunfire areas, and the beach layouts. Unless calls for strikes—or other call support—can be transmitted in the briefest form, unless orders can be phrased in the most terse language, the air control net will jam and fail in the opening minutes of D-day.

Tactical air support of an assault landing presents one of the most complicated problems in coordination that modern warfare has produced. Carriers are, *per se*, admirably fitted to provide the means. The development of the support Air Control System has given us a superb method of applying those means with the precision so essential. We are destined to use them again and again as we draw the noose tighter on Tokyo.

Nothing can take the place of the soundest professional training in arms. There is no substitute for it any more than there is for professional training in medicine.

—Douglas Southall Freeman, author of *Lee's Lieutenants.*

Airborne Invasion--Normandy

LIEUTENANT COLONEL JACK G. CORNETT, *Infantry*
Instructor, Command and General Staff School

The author was assigned to the European theater as a War Department observer and liaison officer in airborne matters for several months prior to D-day, and was assigned to the Airborne Staff Section of First U. S. Army Group on 1 June, giving him an opportunity to note operations of wide scope.

A German account of the American invasion of Normandy appears in the Foreign Military Digests section of this issue, page 85, under the title, "The Battle for Cotentin."—THE EDITOR.

WHEN the decision was made in the European theater of operations to precede the Allied landings on the coast of the Cotentin Peninsula with airborne forces, there were in England available for the operation, two airborne divisions: the 82d, which had campaigned in Sicily and Italy, and the 101st, as yet uncommitted in action but an old organization with personnel of long experience and training in airborne work. Each division was strongly reinforced by the addition of separate parachute units attached by higher authority, and had had several months for training and preparation for the operation as a unit. Planning was of such a nature and missions were assigned so that accomplishment could be culminated even if unfavorable circumstances were encountered during reorganization periods, and even though action would have to be piecemeal. In the light of operations the planning on this basis was sound, since some units were on a somewhat independent basis for several hours after landing. After decisions were made, the opportunity was given for some movement on a full scale with the air units which were to transport the divisions, and it was felt that such training was invaluable to future success.

The story actually began several weeks and months before, when the divisions were authorized to cut loose from the standard Tables of Organization and Equipment and to reorganize in line with the desires of their commanding generals according to their decisions of what was needed to accomplish the job on hand. It wasn't a new concept, but it was one which had been hard to sell to the proper people, and rightfully enough the divisions felt that a hard portion of the battle was won when they were permitted this action. Most of the senior commanders and more experienced officers of both parachute and glider troops had long felt that the airborne division as prescribed in T/O's, while an efficient organization for training, administration, planning, and preparation for a combat assignment, was not best suited for combat because of the more or less unbalanced organization of its potential strength. This theory, which it of necessity was until tried in France, proved exceedingly sound, and is now generally accepted as the basis on which any future operations will be mounted. In short, the airborne division remains just the way it is according to the books, and its commander will administer, train, and plan under standard organization, but when shooting is in sight he will be given *carte blanche*, within reasonable limits, to reorganize for attack as he believes the situation warrants. It was one of the valuable lessons of the campaign, and a very meaty contribution to the future of airborne forces.

With this authority in hand, and reinforced by sizeable parachute elements, each division was ready to go. The missions given to each were multiple, but the primary task to be done was to care for the situation inland from the beaches in such a manner that the greatest aid could be given to the debouchement of the seaborne assault forces from the exits of those beaches; to protect them during the exit by pinning German reserves to the ground, by seizing causeways across inundated areas in front of the landings, by cutting communications inland, and by seizing and either holding or destroying vital water crossings against enemy inter-

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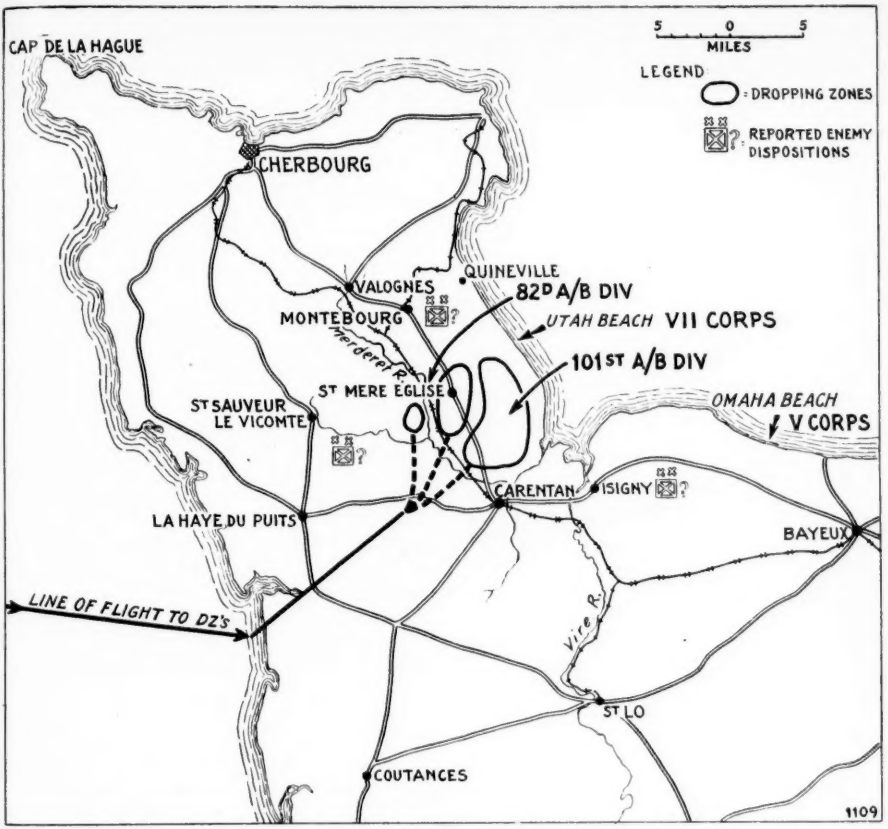
ference. Also, in addition to these principal tasks, the 82d was to protect the right flank of the VII Corps charged with the coastal assault. Plans were changed twice prior to a final decision because of movements of enemy forces within the target area, but finally intelligence reports and the missions assigned slid into conjunction, and the orders were drawn. All of that plan cannot yet be told, but briefly, a decision was made to commit the entire parachute force of both divisions simultaneously, to be followed up by the glider elements in later echelons. Certain gliders carrying various loads and personnel, of course, were in the first flight of aircraft across the channel, but in the main it was a parachute assault. Careful coordination between air and ground partners of the task force was the rule of the day, and an ultimate of cooperation in an attempt to do anything possible that the airborne divisions wanted was given by the troop carrier assigned to the operation. Intensive training, rehearsal, and combined preparation for this single and particular mission was the one and only thought of both air and ground for many arduous weeks before anyone had any inkling as to when D-day would actually be. A route of approach to the drop zones (DZ's) was chosen to avoid as much as possible enemy interference and hostile antiaircraft, with the thought in mind also not to fly over our own friendly naval forces which were carrying the ground forces toward the beaches at that very moment. This route was in a circuitous path from southern England close by the Channel Islands and thence inland to the final areas selected for landing, and while it didn't completely circumvent all the Jerry flak, the reaction was not strong to the first flights to make a landfall, i.e., to cross the coast of Normandy on the way inland to the DZ's, although as the defenses became alerted by the massive air movements overhead, later formations did receive much greater opposition. The takeoff's, rendezvous, and flights to target were more or less as routine as such a thing can be, and the dropping began almost exactly on time.

Operations

The sketch map on page 23 shows the landings made by the various units of both divisions at shortly after midnight 6 June, and indicates the German units opposing them. Actually, although the landings were generally in the area planned, certain smaller elements and portions of the headquarters groups were widely scattered, and within the general area companies, battalions, and even regiments and parts of the two divisions were somewhat mixed one with the other, so far as effecting a complete reorganization before daylight was concerned. Because the decisions made by the commanders concerned had envisioned that such a mixing might occur, plans had been made and missions assigned to lower units in such a way that the action could progress according to plan, even though a series of semi-independent ventures was the rule rather than one concerted one. The troops involved were massed and succeeded in quickly bringing together sizeable formations which immediately launched attacks against the nearest of the assigned objectives, and in this manner were firmly in control of the situation when they were joined by advance elements of the seaborne forces some hours later. The accidental scattering which came because of failure always to place the airborne elements over the fields originally planned contributed some rather malapropos situations, however, certain of which resulted in successful contributions to the over-all scheme, while others were not so fortunate in their consequence. The Jerry was out in force the night of the drop, either on some sort of a maneuver or exercise or else actually awaiting the beginning of the invasion, and for most of the first waves into action, instant entry into combat was demanded by the situation. One incident which turned out with great success was the landing of the division commander of the 101st Division by parachute, together with his chief of staff and portions of the divisional advance CP personnel, in the first flight across the DZ's. The aircraft carrying this element misplaced them slightly, and upon orienting themselves on the ground and contacting all the friendly



troops in the immediate neighborhood, a force of about the size of an infantry platoon was grouped, commanded by a major general! They found themselves to be near the end of one of the strategic causeways to the beaches, which crossed an inundated area and which was particularly desired intact by the incoming vehicles at H-hour. The enemy was not apparent in any strength, so reacting with the vigor demanded by such a situation, the general deployed his miniature task force, attacked and secured the strategic bit of terrain, and held it until it could be turned over to other units at a later hour. This action was typical of the trend of thought and spirit of all personnel, and was the major factor contributing to success under unfavorable conditions.

Across the Merderet River, however, part of a parachute battalion with elements of the regimental headquarters accompanying it was dropped outside of friendly lines and almost immediately surrounded by hostile forces in preponderant strength. They fought determinedly and savagely against heavy odds for nearly four days and nights while attempts made to locate and relieve them were to no avail, and finally, without food or water and down to their last rounds of ammunition, their commanding officer ordered

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them to scatter and attempt individually to infiltrate back to the main body. A few succeeded but most were lost, among them the regimental commander, as prisoners of war. The results of training in the airborne units, which had always tried to make each individual soldier an aggressive, self-reliant, and physically superb fighter, paid dividends in the early hours of the action before units became cohesive organizations, and during which time each man or small group of men were on their own. This condition and the reaction to it was illustrated by the number of decorations and citations awarded in each division, while the Senior Ground Commander of American Army personnel, Lieutenant General Omar N. Bradley, stated for publication that the contribution made to the over-all operation by the airborne phase was of great help in accomplishing the landings and in subsequent actions. Certainly, the troops in front of whose beach they fought came ashore with less resistance than those who assaulted the beach defenses without assistance from airborne troops, and just as certainly, the missions assigned for the initial drops were accomplished in every instance. Because of the violent reaction of the German forces in Normandy to the thrust, it was necessary to retain the airborne divisions in the lines of the American forces as ground units for a period many days in excess of that originally planned. They were assigned sectors in the fighting for the Cotentin Peninsula and were included in the plans for defeating the German forces throughout the entire campaign in this area until some time after Cherbourg had fallen and the army was regrouped for the drive to the south. The difficulties of such purely ground operations for units organized, and as lightly equipped, as an airborne division is obvious, but they carried their share of the burden of attack until casualties (replacements were held for them until after they quit the battle area) reduced the striking strength by nearly one half at the time they were relieved. The conditions under which they operated were difficult. Not alone because of their inherent lack of mobility on the ground, for they corrected this with captured motor equipment in most instances, but also because of the type of action involved, certain key staff officers were lost in the first few hours, and an even greater number of senior officers in command positions. Battalions were fought by company grade officers, and junior staff officers took over and calmly performed in a capable manner the duties of positions far above their experience. Each division was brought into a coherent organization controlled by the division CP after the first few hours, and throughout the campaign operated as such. It was an experience most gratifying to those who had backed the formation and expansion of airborne forces from their infancy, to be so completely justified in their beliefs as to the worth of this arm when properly employed, and just as valuable an experience to others to know their value in assisting major operations of this and other types.

Air discipline has its roots in ground discipline. Discipline on the ground is attained by many things, mostly small things. It means more than saluting or saying "Sir" to a superior officer. These are but evidence of good discipline. Real discipline is in the mind. It is the mental attitude and the will to promptly and cheerfully execute orders to the best of one's ability. This state of mind does not spring up over night. Discipline is the product of careful training, and of the influence by instructors until it becomes subconscious and automatic. When this mental state is achieved, we have the dependability needed for a fighting team, a successful fighting team.

—I Fighter Command Circular 50-16,
Mitchel Field, New York, 17 May 1944.

Training and Combat Lessons -- Experience of a New Division in Italy

MAJOR GENERAL JOHN E. SLOAN
Commanding General, 88th Infantry Division

THERE is no truer axiom than the training of a unit will be most strongly reflected in the results of its first campaign. If a division gives a highly creditable account of itself and achieves marked success in its initial introduction to combat against a capable, veteran enemy, the first and most logical conclusion must be that its training has been thoroughly conducted and effectively applied. This relationship between precombat training and battle performance is of special interest to the commanders and staffs of those units now preparing for the test of the battlefield. Therefore the experience of the 88th Infantry Division, which saw its first combat service in the preparatory stages of the May offensive in Italy and participated with most satisfactory results in this major operation which drove the German from his strongly prepared winter lines into disorganized retreat north of Rome, is believed appropriate here as a matter of more than passing interest. The following discussion is not intended as a means of sounding the praise of a unit by its commander. Rather its purpose is to outline the various stages of training that were undergone, show the results of this training, and record the major lessons that may be drawn from this training in relation to first combat experience.

At the time it arrived and took up its initial sector in the line some weeks before the spring offensive in Italy was launched, the 88th Infantry Division was a newly reactivated, unblooded division. The Italian campaign, then in its fourth month of bitter fighting, was to provide for the 88th its first taste of actual combat. The basic and unit training had been carried out under standard programs and had been carefully and thoroughly conducted. The Division had, prior to its departure from the United States, received its required combined and maneuver training and had successfully completed all the Ground Forces Tests requisite to qualify units for general service overseas. As a matter of passing comment, it should be stated that these tests were of particular value in that they provided for the units themselves (in addition to the War Department inspectors) a satisfactory yardstick for measuring their own state of training and their readiness for combat. Confidence of officers and men was naturally high on the completion of these "examinations for battle." On the whole, it was felt at the time of departure overseas, that the training of the Division had been sound, and that basically, the units were prepared for the tasks that lay ahead.

Not that there existed any notion of "knowing it all." The experience of other divisions in the previous campaigns in Tunisia and in Sicily, and in the preceding months of fighting in Italy, published in reports and evaluated combat lessons from the North African Theater, clearly indicated that even the battle-tested unit can and does learn something from every campaign and every battle. The 88th Division went overseas armed with the conviction that every element of additional training, especially of the sort derived from the recent battle experience of its predecessors in action, should be secured and applied as added preparation for the coming test of actual combat. The Division was now about to "play for keeps." Every strong card it could draw would count in winning the stakes of battle. This conviction, and the means that were available for converting it into further training were of great value in the results of the Division's action.

After arrival in the North African Theater, the Division seized every opportunity to avail itself of the training facilities there provided for the final period before the units were committed to the line. Of special benefit were the services of certain schools and training centers in the theater which con-

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ducted special instruction under battle-experienced personnel who passed on to the units the latest combat experience of the theater. Notable among these programs of instruction were the courses given in mine warfare and Bailey bridges, in which cadres of officers and men alike received thorough familiarization with the problems of German mines and the enemy tactics of their use, as well as training in detecting, disarming, and clearing the various types of mines that had been encountered in the field, and the application of these new type bridges. The fine points of recent experience were also covered. All available time was applied to physical hardening and mountain warfare training. It remained only to create a leaven of battle-experienced officers and noncommissioned officers within the Division to complete the training preparations to their ultimate degree.

Accordingly, arrangements were made to send a group of 108 officers and 216 noncommissioned officers to front-line units for a period of thirty days' actual combat duty. These officers and noncom's were not sent forward as observers. They were attached to units in the line for company and battalion duty, and consequently actually commanded and led troops under combat conditions. This experience was of immeasurable benefit to the individuals themselves, and provided the Division on their return from this period of duty with the desired leaven of battle-experienced officers and noncom's before the Division was committed to the line as a whole. The results of this special training were of tremendous value, and from this experience, such procedure is recommended for all new divisions whenever possible.

After the arrival of the Division in the combat zone, a further opportunity was given for all officers to visit the front-line areas, and become accustomed to battle conditions, and gain the "feel of the line." In this way, all officers were able to familiarize themselves with the type of terrain in which they were to command their troops, with the problems and peculiarities of the fighting, and with innumerable details that greatly improved their capacity as troop leaders when the Division took over its sector a short while later. This was the last phase of the Division's pre-combat training. The development of this training, as outlined above, is considered ideal for any comparable units, and the results were all that a commander could wish.

The first period of combat service after the Division was committed to the line was favorable for the further perfecting of this process of progressive and accelerated training above described. The sector taken over was, in the period of regrouping and preparation for the May offensive, a relatively quiet one, and units of the Division were carefully and gradually "broken in" with respect to individual and unit combat. The sector was at first extremely wide but later was reduced to permit rotation of regiments and battalions in the line, which gave all elements thorough experience and provided the additional valuable training in the relief of organizations in the battle line. In a measure, the first few weeks of line service can be regarded as the ultimate of a battle school course on a large scale with a real, live enemy in front. It was the final and best culmination possible of all the progressive training which the Division received. The men and their units as a whole became accustomed to the realities and the problems of combat conditions. Casualties were suffered, though in small numbers, and the feel of battle was acquired by all elements. The period presented excellent opportunity for perfecting techniques previously stressed in training, especially in the conduct of scouting and patrolling, in small unit tactics, and in many details of battle. Prisoners were taken, and the men learned the enemy's habits and tactics. Combat efficiency increased steadily as the day for the spring offensive approached. It is believed to be no exaggeration to state that on the evening of the attack which broke the German line and began the long drive to the north of Italy, no comparable troops have been better trained than those of the 88th Division. The justification of this lies in the performance of the Division in the

offensive which followed, and this marked success can be laid largely to the process of training which has been outlined here.

One of the most valuable lessons learned from the initial period of combat before the offensive was the demonstration from battle experience that the principles and doctrines that had guided the training were sound and applicable to the battlefield. The men learned fully that what they had been taught over the long period of training was a living body of practical principle which worked, just as the instructors and the "book" had said it would, provided that they applied it properly. This appreciation gave the men the confidence that is essential to the successful soldier —confidence in his weapons, in his training, and in his officers. This was the first and greatest lesson. From it, the men also learned fully to appreciate the more specific and often bitterly learned lessons that men must be physically conditioned and hardened for the severities of combat; that care and proper service of weapons and motor transport are vital; and that discipline in every phase of military life has but one ultimate purpose, to produce capable and dependable troops which can be relied on in battle.

In the broader sense, few tactical lessons that can be regarded as "new" were learned in this campaign. This does not contradict the earlier statement that something will be learned by every unit from every campaign and battle. Much that is learned in combat is learned from mistakes and errors committed, and not from new tactics and new ideas. In the final analysis, the greatest single lesson on the division level was an expansion of the lesson stated above, that the established tactical doctrine and principles provided in our training literature are sound and have been proven correct in battle. It is the application of them that requires the greatest consideration, judgment, and intelligence. These principles which have been developed and established in our service schools must be regarded as a broad guiding framework from which to start in the conduct of combat operations. They must not be mentally compartmented, applied rigidly, or considered as inflexible rules applicable in the same way to every situation regardless of existing peculiarities and conditions. On the contrary, success in battle stems from the greatest flexibility in the application of these principles and the proper fitting of them to the situation of the moment. If this lesson is followed, and if the units are properly trained and led, the commander need have no doubts as to the outcome of the operations of his units in battle.

With respect to the operations of the division staff, several developments and lessons were apparent. The outstanding of these was the setting up of a Movements Control Officer as the coordinating agency between G-3 and G-4 in control of all major movements within the Division. Because of the nature and peculiarities of the campaign, the terrain, and the road nets available, it was found necessary to establish a single controlling agency which should be responsible for the planning, coordination, and supervision of movements. As such, the Movements Control Officer and his assistant have proved to be a most satisfactory solution to the problem of traffic control and all divisional movement. He works closely between the G-3 and G-4 sections, and for operations and supply, sets up the organization, plans the actual movements, and coordinates the necessary details with all concerned. This semi-separate staff agency, although not provided for under the Table of Organization, and made up of personnel borrowed from other staff elements, has proved to be a most valuable and efficient addition to division staff procedure.

The importance of liaison officers as staff assistants to the division commander has been brought out in strong relief in the Italian campaign. The first noticeable lesson in their connection has been the shortage of officers available. The Division is allowed a total of three, whereas combat experience has shown that six is the minimum that is required for effective combat operations. Each division, without having to reach down into the lower units, should have with its own staff a liaison officer for duty with each

of the three regimental combat teams, one for the divisions on each flank, and one with the parent corps headquarters. These officers are absolutely essential for proper coordination with the higher, intermediate, and lower echelons of command. Liaison officers should be mature, trained, and experienced. They should have sound working knowledge and familiarity of the several principal combat arms, and should have sufficient rank to be able to speak with assurance and conviction when dealing with higher commanders on behalf of the division commander.

A large part of the campaign involved mountain warfare in all phases, with all its attending problems and difficulties of movement, supply, and operation. It must be remembered that mountain warfare affects staff functions in as great a degree as it does actual unit operations. Consequently the lesson is apparent that when a division is to operate in a region where mountain fighting is likely to prevail, the members of the staff must have special training in and become familiar with the problems of logistics, supply, movements, and other vital details that are produced by mountainous terrain. They must, in assisting the commander in his conduct of the action, understand the logistics of supply by pack mule, by hand carry, and if necessary, by air, and they must be trained to apply the principle of strict economy in fulfilling the needs of the troops they serve. This is especially important when operations in mountainous country extend over prolonged periods of time.

Another lesson with relation to supply has been apparent in the need of more economy and a greater degree of common sense in the matter of the soldier's personal equipment carried into combat. Experience has shown that much waste and considerable loss occurs when units are sent into the combat area with full Table of Equipment allowances of individual equipment. The soldier should carry with him only the bare necessities. Army supply units including bath and clothing exchange units should be pushed well forward and be readily available within easy reach of the divisions. The divisional units when coming out of the line can then replace losses and unserviceable clothing and equipment without delay; and they can effect the salvage of soiled clothing and worn but salvageable articles, thus reducing losses of equipment and adding at the same time to the physical well-being, comfort, and morale of the individual soldier.

Too often the importance of the duties of the Provost Marshal and his military police platoon are not fully appreciated or understood until the division enters the combat zone. The chief lesson-experience of this Division on this point has been that the number of men available to the Provost Marshal is not adequate for the tasks of road and traffic control, prisoner-of-war handling and evacuation, and the numerous other duties that the Provost and his platoon are called upon to carry out. The use of bandsmen as supplementary strength for the military police platoon has not been very satisfactory. Even with careful training, the average bandsman, primarily a musician, is not temperamentally fitted to the exacting duties of military police under combat conditions.

The above items serve to high-light the more important points in staff matters reflected by campaign experience. On the whole, the same lesson cited with regard to tactical doctrine has been found true in the case of staff functions and procedure. The standard teachings have been found in this Division to be sound and essentially workable. As in the case of tactical doctrine, the principal lesson has been the need for flexible, common-sense application based on sound judgment.

Preventive maintenance means planning ahead to meet any emergency by having your equipment in top order and functioning properly at all times.

—Maintenance Division, ASF

"Dad, Set Me Straight"

MAJOR SAMUEL PIERCE, JR., *Infantry*
Instructor, Command and General Staff School

A YOUNG officer, who had served in the "line" since he was commissioned in 1940, has just been graduated from a well known staff school. He is now en route to his new assignment which will place him in a staff position for the first time in his military career. He faces this new job with some qualms, and decides to stop off over night at his home and talk it over with his father. You see, "Dad" is a full colonel, retired, with many years experience in similar staff positions in the Army. He has been recalled to duty, and is presently holding an important job here in the zone of the interior. He is just a little restless that he is considered too old for active service. We shall listen in on the conversation which takes place in Dad's office, to which Dad and Bill have adjourned the morning after Captain Bill arrived home.

BILL. Dad, I suppose you wonder why I I am here looking for information so soon after graduating from the school.

DAD. Yes, Bill, I did wonder when you came in last night. What is it, don't the school solutions cover all the answers now?

BILL. Dad, those school solutions nearly cover everything, but that's not what I am here for. My problem is not taken up in any school I have attended so far, and frankly I am ashamed to bare my ignorance before anyone. I know you won't think me completely stupid, even though I did come home for help. My trouble is that somewhere along the line I have missed out on something which should be very basic in every officer's training. Now my ignorance appalls me, and I hope you can help. Frankly, I don't know much about such things as War Department Circulars, Field Service Regulations, and Army Regulations, and their relation. Bulletins, circulars, all those documents puzzle me. I know I should be up on all of it, but I'm not. Dad, set me straight, will you?

DAD. [Smiles slowly during this confession, and then, lighting his favorite pipe, he leans back in his easy chair and begins.] Bill, I was in the same predicament about twenty-five years ago. I was transferred to a new job and felt the same way you do now. The regimental sergeant major of the unit I was leaving helped me out. I remember well how carefully he explained it all to me. Times have changed, but believe me I took careful notice of all changes so the latest doctrine and the latest publications were always available to me. Let's consider Army Regulations first. AR 1-15 states: "The President is the Constitutional Commander in Chief of the Army, is vested with a general and exclusive authority to make and publish regulations for the Army and may, in the due execution of the laws for the Government of the Army, make needful and proper regulations without any legislative authority whatever . . ." The President exercises his authority as Commander in Chief through the Secretary of War. By the order of the Secretary, Army Regulations are published. They are then in a sense directives of the President. They establish the "policy" of the Army. You have referred to them occasionally I am sure, but do you understand how they are grouped into series, and indexed?

BILL. No, Dad, even though I have had to refer to them more than just "occasionally," I must admit I don't know.

DAD. Each Army Regulation has a title and a subtitle, and a number consisting of two parts separated by a dash. The general title groups regulations dealing with the same subject all into one series. The subtitle deals with only a particular regulation covering one phase of this subject. The example that is used in Army Regulations 1-15 to illustrate this point is AR 600-15, Personnel —Rank and Precedence. In this case, the title, Personnel, and the number preceding the dash, 600, all refer to a series of regulations concerning personnel. The subtitle, Rank and Precedence, and the number following the dash, 15, refer to only one regulation in that series, namely, the one dealing with rank and precedence. Do you follow me?

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BILL. Yes, Dad, I do. That makes it seem relatively simple. But what about these everlasting changes?

DAD. They are not so hard to keep up with, if one begins early in the game to read them thoroughly and to post them to the proper regulations. Whenever an Army Regulation is changed, a leaflet bearing the changed material will be published. When this is done, the fact is noted in current War Department Circulars. Since 7 August 1942, changes do not include previously changed material. This means that one must retain all changes on file. You may be sure that every effort is made to keep the number of these changes at a minimum.

BILL. I'm sure that is done, but with all the effort expended in this direction, the material does change. How can an officer be sure that he has the latest, correct information on any particular point covered in regulations?

DAD. That's not so difficult, Bill. A simple yet direct approach is to follow these three steps: First, refer to the Index to Army Regulations. This is published as AR 1-5, annually on 1 January. In this manner you will obtain the basic regulation applicable to the subject you are interested in. This index lists all regulations according to the subject covered. Second, refer to AR 1-10. This is published semiannually, and is a numerical list of current and suspended pamphlets. Your next move is to refer to the monthly publication entitled: Lists of War Department Publications and Index to General Orders, Bulletins and Numbered Circulars. This will tell you if the regulation you are interested in has been changed during the preceding calendar month. By referring to War Department Circulars issued since the first of the month you can easily determine if there has been any change since this last list was published, because all such changes are announced in the circulars.

BILL. You make that sound easy, Dad. Now tell me, what is the relation between these circulars you have mentioned several times and the Army Regulations?

DAD. War Department Circulars are issued in numbered sequence throughout the year. They are used to disseminate rapidly information which is directive in nature, general in application, and temporary in duration. Temporary changes in policy, for example, would be announced in such a manner. Before 7 August 1942, they actually changed Army Regulations, until such time as changes could be incorporated into new regulations. Since that date, however, they are not used for that purpose but they do announce that changes are being issued and just what the changes are. By using this fact, one can be sure his information is as late as the most recent numbered circular which has been issued.

BILL. That clears that up for me, Dad, but it seems that I have noticed other documents which put out information from "topside." Can you tell me something about them, and their significance?

DAD. War Department General Orders are one form you must be familiar with. They include important directives which are general in application and of permanent duration, which can't be readily incorporated in the established forms of regulations. For example, they were the means used when Corps Areas were redesignated as Service Commands. War Department Special Orders promulgate directives which affect the status of individuals, detachments, organizations, and units. You have probably traveled on these many times. Bulletins are published from time to time to disseminate information which is advisory in nature and permanent in duration. Memoranda are directive in nature and not of permanent duration. Remember that any headquarters may issue general and special orders, and bulletins, and memoranda. They are used in the same manner that these are used by the War Department itself. Does that straighten you out"?

BILL. Dad, I should say it does. There are just one or two more points I would like to discuss with you before I have to rush off for my train. What is the situation on training publications?

DAD. The basis of all instruction is the Field Service Regulations. They are published as Field Manuals, and constitute the

basis of instructions for all arms and services in the operation of war. Here you will find the basic doctrine which is expanded and applied in other texts. Field Service Regulations are the source of the fundamental considerations of the employment of the combined arms and the combined services in the strategical, tactical, and administrative employment of larger units and territorial commands. Army Regulations 310-10 gives the authority for, and instructions covering, the publication of these FSR's by the chiefs of the arms and services concerned. These manuals may be divided into three general divisions: Field Manuals, which are designated as FM, and published for the arms and services with instructions relative to the tactics and technique involved in the employment of these arms and services, together with data needed in the theater of operations. Next, the Basic Field Manuals, designated BFM, which contain training and reference data applicable to more than one arm or service, and with special reference to the smaller units. Last, the Staff Officers' Field Manual, which is a compilation of information and data to be used as a guide for the operation in the field of a general staff, or a similar staff group in peace or war. Four manuals are actually designated as Field Service Regulations. These are FSR 100-5, Operations; 100-10, Administration; 100-15, Larger Units; and 100-20, Command and Employment of Air Power.

BILL. How are changes in the doctrine, tactics, or technique covered in these manuals disseminated when the need for such changes comes up?

DAD. Numbered changes are used for this purpose, but Training Circulars are important too. They, in a sense, supplement the other training publications by getting this information out immediately to the units or headquarters concerned. This information in some cases may be of a temporary nature, and may not be closely allied to the scope of existing manuals. When such Training Circulars are published, the preparing agency (Army Ground Forces, Army Service Forces, or Army Air Forces) will take immediate steps to incorporate the provisions into a numbered change to a manual, or they will revise that manual, or they will put out a new numbered manual. You see, blanks are left in the numerical sequence of manuals for just this purpose. One thing about these Training Circulars which it is important to remember is that unless they are sooner superseded, or rescinded by other action, all matter published in Training Circulars will be voided automatically one year from the date of publication. The date on which a circular becomes void will be printed in bold type immediately under its heading. Changes, when published as such, are printed when it is deemed inadvisable to revise and reprint an entire manual. They are printed on one side only of stock which is smaller in size than the manual as printed. In this way they can be cut and pasted over the material which they change. When additional copies of a manual which has had several changes published are needed, the manual may be reprinted. When this is done, all changes are added in proper sequence and bound after the last page of the text. A note indicating that this is a reprint is placed on the title and cover pages. When material has been sufficiently changed to warrant a *revision*, then the material of these changes is incorporated into the text of the manual. Changes for each edition of a manual are numbered consecutively, and a new series is started with the first change after a revision.

BILL. Dad, what is the relation of Technical Manuals to this training task?

DAD. Well, Bill, it is easy to see where some subjects necessary to the operation of a highly complex military machine will warrant separate treatment. When it is felt that such treatment is warranted, Technical Manuals are issued covering the subjects in question. These are kept up-to-date by the use of numbered changes and Technical Bulletins, which operate in the same manner as the Training Circulars operate to keep Field Manuals up-to-date. While we are on the subject of training, I might recommend that you get a copy of FM 21-6, Lists of Publications for Training. It is a complete compila-

tion of these manuals. You will find it a handy reference when the need for their use arises. On second thought, here, I will give you my copy to take along. This manual was published 1 February 1944, and since then six changes in pamphlet form have been issued. The manual will probably be revised soon, because as you can see, the changes now outweigh the original manual.

BILL. I think that about covers the picture, Dad. I am very grateful for your help. As I have taken a few notes while you were talking, I now feel that, while I still have a lot to learn, I have a better idea of what is what about these many publications. Will I have my own file of all these publications at my new station?

DAD. No, that is discouraged. You won't really need a file of your own. There will be a file available to you, and in most cases they are kept well and accurately. Of course, if your work requires that you have a personal set, then such may be made available to you.

BILL. Thanks a million, Dad, for your help. I certainly appreciate it. I must leave now. The train leaves shortly and I will just about have time to make the station.

DAD. You are welcome, son. I am glad to be of some assistance. Just remember, read and analyze all problems carefully, use the little ideas I suggested and get the latest official information, and when you are sure you are right, go ahead.

BILL. I'll try, Dad.

DAD. You'll do it, son, I know you will. Good luck on your new job. I hope I've set you straight.

Bill takes his departure, Dad leans forward a little and reflects a bit on the meeting he has just had with his boy. After a few minutes reflection, he refills his pipe and, thinking aloud, says: "Guess it pays an old war-horse to keep abreast of things even at this late date."

"Taxi!"

From a British source.

A GROUP of the British 2d Tactical Air Force in Normandy is adopting "cab rank" tactics in its close coordination with army operations. Several times recently Typhoon fighter-bombers have been called up to smash strongpoints which were preventing ground forces from advancing.

"Taxi-square Four, bomb that white house with the smoking chimney," calls a voice over the radio-telephone. Instantly the Typhoon formation, which has been hovering over the battleline awaiting such a summons, dives on the enemy strongpoint.

The first essentials for "cab rank" support are a temporarily static fighting area and terrain which can be overlooked from advance vantage points. From this, the army spearhead commander and an RAF observer operate from a vehicle in radio touch with the forward army unit and ground control. Their map of the sector is marked off in a grid based on recognizable features of the landscape. Overhead is a standing patrol of aircraft which may be rocket or bomb-carrying Typhoons, or Mustangs. The pilots have a similar map and the stage is set. Should a forward army unit or a patrol report being held up, it will signal back its requirements. Observers, identifying the target, call up aircraft and guide the pilots, who can find their objectives from the precise descriptive direction given. The range-finding is all done in plain speech. The time-lag between the request and the execution is so small that there is little the enemy can do, and air-to-ground contact is so close that the aircraft is sometimes diverted and corrected when the pilot is seen diving on the wrong target.

The air side of this cooperation is economically organized. For a stated time, fighter-bombers patrol on call over an assigned area, then, when relieved by the next line of "taxies," they go on and carry out armed reconnaissance.

Planning Phase of Amphibious Operations as a Prelude to Jungle Operations

LIEUTENANT COLONEL JAMES M. EMIGH, *Field Artillery*
Instructor, Command and General Staff School

SINCE the entry of the United States into the war in December 1941, virtually every operation conducted by the United Nations has involved amphibious operations. Guadalcanal, North Africa, Sicily, Salerno, Nettuno, Anzio, New Guinea, the upper Solomons, New Britain, the Gilbert Islands, and the Marshall Islands have developed the pattern for such operations.

No two operations are alike, and yet certain techniques are common to all. The basic principles of war concerning mass, mobility, and surprise coupled with necessity have been applied successfully to waterborne invasions at numerous points.

Ship-to-shore or shore-to-shore operations may be executed, the range of operations and types of craft available being the prime considerations and determining factors.

Most of the operations of this type in the Pacific Area, once the assault forces have landed, immediately resolve themselves into jungle warfare, since the terrain inland from the beach is heavy tropical jungle growth interspersed with mountains. All of our operations in Guadalcanal, New Guinea, the upper Solomons, and New Britain have been of this nature.

Amphibious operations are combined operations involving Ground, Air, Navy, and Services of Supply. In order to insure unity of effect, there must be unity of command and complete coordination and cooperation between the various services involved during both the planning phase and the operational phase.

Special training and special equipment are necessary for such an operation. Planning is the secret of success, since the operations initially will be carried out by small forces under decentralized control. Planning must be long-range, detailed, thorough, deliberate, and flexible. Alternate plans must be prepared in order that they can be put into effect with modification, with a minimum of delay, in case the initial plan should not meet with success or should appear impracticable at the last moment. Planning is not an overnight task, but requires at best many weeks of long, hard work and does not end until the operation has jumped off successfully.

Among the major considerations affecting the initial landings in an amphibious operation are:

a. Objective and terrain.
b. Information of the enemy.
c. Air support.
d. Naval support.
e. Hydrographic conditions.
f. Meteorological conditions.

Objective and Terrain:

Objective and terrain require study from the highest level for large scale amphibious operations.

The size of the land body concerned, and objectives, are early considerations.

Intervening terrain between landings and objectives and seizure of key points must be considered.

Landing areas can be selected only after extensive study of the coastline, coupled with careful consideration of the element of surprise as to the time and place of landings.

Information of the Enemy:

A sound technical plan cannot be arrived at until all possible information of the enemy has been studied and carefully evaluated.

Air Support:

Air superiority is an essential element of an amphibious operation. Mr. Churchill coins the word "triphibious" for such operations. In addition to the softening-up process by bombing, combat support in the air during the operation is highly essential.

The advantages to be gained by use of airborne troops dropped in force behind enemy lines and of supply by air transport must not be overlooked.

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The early capture and repair of air fields on the hostile shore is of major importance.

Naval Support:

The major functions of the Navy in an amphibious operation involving Army troops are convoy protection, naval gunfire support, and the landing of troops, equipment, and supplies.

The landing of troops, equipment, and supplies in a shore-to-shore operation, however, will be accomplished by an Engineer Special Brigade, in a "*pure*" shore-to-shore operation. The use of engineer boats is extremely restricted as to range of action. Very frequently they too will be carried on troop carriers and will land the troops in a ship-to-shore movement.

Hydrographic Conditions:

The most careful study of hydrographic conditions is necessary. This must include offshore conditions, tidal ranges, beach conditions, location of both natural and artificial under-water hazards and obstacles, and the direction and force of winds and currents.

Meteorological Conditions:

A careful study of meteorological conditions must be made to include the effect of lunar cycle on tide ranges, the direction and strength of wind, light condition, and length of the night.

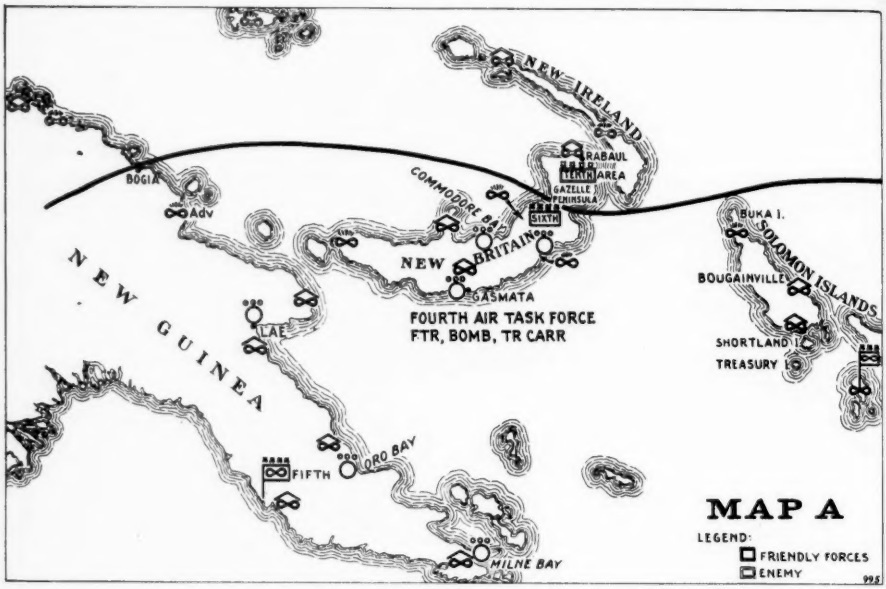

FIGURE 1.

Let us consider an *assumed* situation involving a combined operation in New Britain, with a shore-to-shore amphibious operation as a prelude to a jungle operation, employing forces of Ground, Air, Navy, and Services of Supply.

The purpose of this situation is to bring out the more important factors which must be considered, and to stress the long-range and detailed planning and the coordination necessary to insure the successful functioning of combined forces in such an operation.

GENERAL SITUATION: Map A (Figure 1).

Allied South and Southwest Pacific forces, including ground, air, and naval elements

have completed the reconquest of Bougainville, Buka Islands, Treasury and Shortland Islands, and New Guinea to and including Bogia. New Britain has been overrun except for the Gazelle Peninsula, which is still in the Japanese hands generally north of the line Matalai River—Powell River.

Allied air has established air superiority over the New Guinea—New Ireland area. Allied and Japanese naval forces are operating in the waters north of New Britain.

The Japanese garrison of the Gazelle Peninsula of New Britain consists of the Tenth Area Army, strength approximately 30,000 men (for composition and disposition see Map B).

SPECIAL SITUATION: Map B (Figure 2).

On 10 March 1944, the American Sixth Army consisted of I Corps, composed of the 2d Infantry Division located in the vicinity of Langalanga with one combat team in contact north of the Sai River, and the 3d Light Division (Pack)* in the vicinity of Ubili Airdrome; and the II Corps composed of the 1st Infantry Division in the vicinity of Wide Bay; and the 4th Infantry Division in the vicinity of Jacquinot Bay.

GROUND FORCES PLAN (SIXTH ARMY).

I Corps

2d Infantry Division, less one combat team minus artillery, to remain present location, prepared to move by water on order.

3d Light Division (Pk) to move by water and capture Pondo Harbor. Thereafter, operating northwest of the general line Toriu River—Karavia, to capture Keravat Airdrome and be prepared to advance on Rabaul.

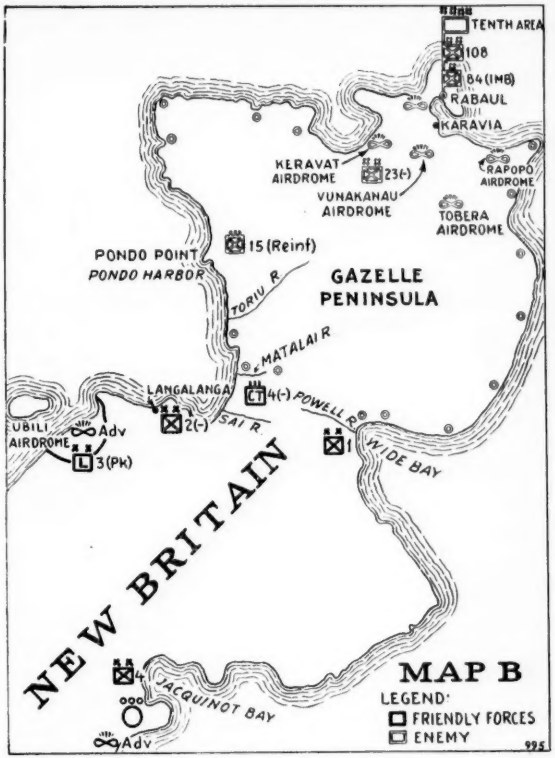

FIGURE 2.

Combat Team 4 (2d Div), less artillery but reinforced by pack train, to operate southeast of the line Toriu River—Karavia, its objective Vunakanau Airdrome.

II Corps

1st Infantry Division, operating in eastern portion of the Gazelle Peninsula, to advance and capture Tobera and Rapopo Airdromes.

4th Infantry Division, to remain present location, prepared to move by water on order and land on beaches to be designated.

Air Plan:

Operating from established bases on New Britain to:

*In the event that a light division is not available, it is felt that the infantry division could readily be substituted for the light division, with certain modifications in reduced strength, lighter weapons, and substitution of either light truck transport or pack transport.

Protect friendly shipping.

Maintain air superiority.

Furnish air support to ground forces. Troop carrier employment to include evacuation and movement of troops and supplies.

Naval Plan:

To provide adequate reconnaissance.

To protect landing operations from enemy naval forces.

To provide, man, equip, and operate such naval small craft as may be assigned for the projected offensive.

To land personnel and matériel of ground forces assigned to such naval craft in accordance with operational plans.

To support landing operations by gunfire, aircraft, and screening operations, including mine sweeping and removal of underwater obstacles.

To provide necessary communications between naval vessels and shore.

SOS Plan:

To supply Sixth Army and Air Force units from advance bases at Gasmata, Jacquinot Bay, and Commodore Bay, all now established on New Britain. Bases to be moved forward as rapidly as the situation permits.

To continue supply of base at Commodore Bay from bases at Lae and Oro Bay, New Guinea, and those at Gasmata and Jacquinot Bay from Milne Bay.

To continue supply of New Guinea bases from Australia.

To continue supply by water of air force supplies from air force depots and service centers to units on New Britain.

Supply Levels:

New Britain—Minimum level of supply, 20 days—Operating level, 15 days.

New Guinea—Minimum level of supply, 40 days.

D-day to be announced, but to be not earlier than 10 April 1944.

SPECIAL SITUATION (Continued).

On 10 March 1944, the CG 3d L Div issued the following instructions at a staff conference at the Div CP at Ubili Airdrome.

"The 3d L Div (Pk) will make a waterborne envelopment of the Japanese defenses N of the TORIU R and establish a beachhead

LANDING CRAFT AND TROOP LIST

LANDING CRAFT AVAILABLE—904th Engr Sp Brig.

	Brig Hq Co	*3 B & X Regts (ea)*	*Maint Co*	*From Navy*	*Total*
Comd/Navig	2	10			32
LCM(3)—50'		90			270
Patrol		12			36
Salvage		3	6		15
LCVP—36'		90			270
LCT(5)—112'				36	36

TROOP LIST, 3D L DIV (REINF) (All unit designations are assumed.)

	O	*WO*	*EM*	*Total*
3d L Div	450	19	8,000	8,469
901st AAA Gp	70	4	1,350	1,424
904th Engr Sp Brig	360	16	7,000	7,376
908th Engr C Bn	29	3	632	664
909th Cml Bn	39	1	582	622
Det, Ord Maint Co AA	2		42	44
910th QM Trk Co (¼-ton Trk)	6		203	209
911th Vet Co (Sep)	5		62	67
Det, 912th Ord Am Co	3		72	75
1st Plat, 913th QM Serv Co	1		99	100
Det, 914th Sig Serv Bn	1		16	17
Det, 915th Sig Pgn Co	2		19	21
Rad Int Plat, 916th Sig Bn	2		30	32
1st to 9th Ptbl Surg Hosp (ea)	4		33	37
917th Field Hosp	22		190	230
	N 18			

securing PONDO HARBOR for further operations across the GAZELLE PENINSULA.

"Two RCTs will be in assault and 1 RCT in floating reserve.

"Necessary feints will be made.

"D-day to be announced, but to be not earlier than 10 April 1944."

The tactical plan for the assault landing might then resolve itself into the following principal considerations:

Limits of beachhead to be established.

Landing areas for the assault combat teams.

Designation of assault units and their necessary attachments.

Locations of feints.

Units to be employed in making feints, with recommended attachments.

TACTICAL PLAN.

After a careful consideration of all factors

previously mentioned, the division staff might arrive at a tactical plan for the assault land-

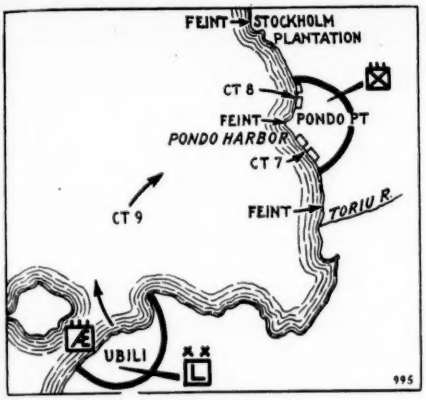

FIGURE 3.

ing which could be portrayed in rough graphical form as in Figure 3.

A beachhead of five miles in radius from Pondo Point is sufficient to restrict fire of Japanese 75-mm field guns from the beachhead.

CT 7 land on right flank on beaches Blue and Yellow.

CT 8 land on left flank on beaches Green and Red.

Each CT use one Bn in floating reserve.

CT 9 in floating Division reserve, to land on beaches to be designated.

Division troops to follow on Division Order.

Feints: North of Toriu River by CT 7, employing 1 Plat Inf, 1 Plat Cml, and Naval and Air Support.

Stockholm Plantation by CT 8, employing 1 Plat Inf, 1 Plat Cml, and Naval and Air Support.

Pondo Harbor by CT 9, employing 1 Rifle Co, 1 Plat Cml, and Naval and Air Support.

TROOP LIST OF A TYPICAL REGIMENTAL CT	*Strength*
CT 7	2,600
(7th Inf; 7th FA Bn, 75-mm How, Pack; 1 Co, 3d Engr LC Bn; 1 Co, 3d Med Bn; 1 QM Pack Co [-].)	
Atchd—Btry A, 3d AA MG Bn	89
Co A, 909th Cml Bn	136
1st Plat, 911th Vet Co (Sep)	14
1st, 2d, 3d Ptbl Surg Hosp	111
	2,950

TROOP LIST OF A TYPICAL BATTALION LANDING TEAM

	O	*EM*	*Total*
1st Bn, 3d L Inf	24	550	574
Btry A, 8th FA Bn, 75-mm How, Pk	4	117	121
1st Plat, 3d Engr LC Bn	1	31	32
1st Plat, Co B, 3d Med Bn	1	16	17
Btry B, 3d AA MG Bn	4	85	89
1st Plat, Co B, 909th Cml Bn	2	30	32
4th Ptbl Surg Hosp	4	33	37
Co A, 1st Bn, 906th Boat & Shore Regt	6	177	183
TOTAL BLT	46	1,039	1,085

Once the tactical plan has been developed and the composition of assault units determined, the division will be confronted with many weeks of modification and revision of plans, and the various units composing the assault units, including the Engineer Special Brigade, must train together and live together until the operation has been perfected in every detail through repeated rehearsal. Then, and only then, will the operation on D-day be successful.

Strange as it may sound, some commanders appreciate an occasional pat on the back. So if you think that some operation or move or exercise originated by your headquarters has gone well, it does no harm to let your commander know the general opinion. And, lastly, in the nature of things commanders are somewhat set apart and are sometimes rather lonely men. They appreciate being treated as human beings and value the friendship of their staff. You will find that, like other intelligent creatures, they respond well to kindness.

—From an article in *The Tank* (Great Britain)

From the Anzio Beachhead to Viterbo--Experience of an Armored Division

MAJOR GENERAL ERNEST N. HARMON
Commanding General, 1st Armored Division

THE terrain conditions prevailing in Italy prior to the period of the May offensive presented little or no opportunity for the employment of the armored division in its normal role. The rugged mountains, close country, limited road nets, and natural obstacles all precluded the maneuver and operations of armor in mass. Operations of tank elements in the earlier stages and during the stabilized period of mountain warfare were largely confined to small unit action involving special missions, and in secondary roles. After the landing of our forces in the Anzio-Nettuno area, the opportunity was presented for large-scale armored operations for the first time. However, the temporary static situation that developed within the beachhead area again prevented the armored elements from assuming their normal offensive role. It was not until the spring offensive, in the break-out attack from the beachhead perimeter, that the 1st Armored Division could be committed to offensive combat in the normal manner, and then the results were effective and satisfactory. From the launching of the attack on Cisterna on 23 May to the withdrawal of the Division from combat at Viterbo and Canino on 10 June, the combat commands of the Division were engaged in a continuous offensive action, interrupted only at brief intervals for necessary maintenance and refitting. The experience of the Division presents several points which should be of interest to all ground commanders.

During the static period within the Anzio beachhead, the Division was mainly employed as a Corps reserve, with the primary mission of providing the main counterattack force against large-scale enemy assault. Its general role was to provide powerful support at any point of the perimeter line that might be seriously threatened. Positions were prepared at all critical points along the line, and the tanks, assault guns, and attached tank destroyers were held ready to occupy them in any locality and at any time that the necessity should arise. The Division was also charged with clearing out any salients that the enemy might drive into the perimeter line, and flexible plans were accordingly prepared in detail for dealing with such eventualities in all critical sectors. The divisional reconnaissance elements also had the mission of maintaining continual patrols along the coast and also along the Mussolini Canal on the right flank of the beachhead positions. Elements of the Division were also used in strong raids to disorganize and disrupt the enemy lines, and on two occasions strong attacks of the armor in force were launched to relieve enemy pressure on the left flank. One of these attacks served successfully to break up a powerful German attack that threatened a critical sector of the line.

During this period, the armored infantry was generally employed as normal infantry in the line. Also, the tanks, assault guns, and attached destroyers were used frequently in their secondary role of reinforcing artillery. This constituted the first extensive use of tanks in this role, though destroyers had been in considerable use as artillery previously in the main southern line on the Fifth Army front. The fire of the destroyers in this role was especially effective for harassing and interdiction missions. Assault guns of the armored infantry and tank units were also organized and employed as "batteries" with good results. Every weapon in the Division was employed whenever possible to reinforce and sustain the fire power of the units supporting the line. The experience of the Division in this period shows well the necessity and the results of adapting the employment of units to the peculiar needs of a given situation. Though it was not possible at this time for its units to be used in the normal offensive role, as the mainstay of the

Corps reserve, giving support, security, and assistance to the other divisions holding the infantry line, the 1st Armored Division fulfilled its special missions well and contributed much to the action in the beachhead.

The role and missions of the Division above outlined were terminated with the launching of the spring offensive from the beachhead on 23 May. In this attack and in the continuous action that followed to the Viterbo-Canino line north of Rome, there took place the first large-scale armored offensive operation by American forces in Italy. The outstanding success of the break-out attack and the continued successful operations can be largely attributed to the careful and detailed planning and preparatory training that were conducted prior to the initial attack. Never in the history of the Division were plans and training more thoroughly and effectively carried on. Training areas were selected for the infantry and tanks, and the organic infantry and an attached regiment were carefully trained to work with the armored units with which they were to be employed. The closest cooperation and understanding of the combined action of the two arms were sought in this thorough preparatory training, full dress rehearsals were conducted, and with few exceptions, the results showed well the effect of such preparation.

Until about 20 May, it was not known whether the Corps would attack towards Cori, Albano, or Terracina, and the Corps Commander directed that the Division be prepared to attack in any of the three directions. Accordingly, plans were drawn up for full-scale attack in each of the three areas. These plans involved detailed tactical and logistical studies on the part of the Division and Combat Command Commanders and their staffs, the selection of final assembly areas and firing positions by unit commanders and their staffs, and reconnaissance of the terrain by liaison aircraft, air-photograph study, and by personal observation by all unit leaders down to squads and tank commanders. Artillery positions were prepared in support of attacks in all three of the possible directions, and were provided with completely stocked ammunition dumps in all three sectors. Every preparation, both with respect to planning, supply, and training was made. Definite information was not received until two days before the attack as to which of the three possible axes of advance would be selected. The Division, through its preparations and planning, was ready to execute the one selected on short notice. The main lesson to be drawn from this experience is the necessity for full and flexible planning, and the thorough training of the infantry and tank elements together, in order to insure their working effectively as a coordinated team.

The initial attack out of the beachhead perimeter was rapid and successful, and tank-borne infantry was used for the first time by American forces. This operational combination of the two arms was especially effective for rapid mopping up of strongpoints and other centers of resistance. It was also used to advantage in some phases of the pursuit. Riflemen and their supporting heavy weapons could be brought up rapidly to consolidate ground overrun by the medium tanks. One disadvantage was apparent in this type of employment. Reorganization after dismounting and deployment was often quite difficult. While the infantrymen were mounted on the tanks, it was not possible to maintain any real squad or platoon organization, and this situation required rectification after the men dismounted and deployed.

A contributing factor in the successful advance of the Division was the combat formation that was used in the break-out and continued throughout the drive to the north of Rome. In each case the advance was led by waves of medium tanks which, through fire power and shock action, pressed through the enemy positions, taking losses as the situation required. The infantry, closely supported by the light tanks, followed in the wake of the medium tanks. Experience had previously shown that infantry following a tank advance may be successfully attacked and delayed by determined enemy troops which have been passed by the leading armor. Thus the light tanks were placed with the following infantry, which gave the necessary armored

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support against any pockets of resistance left by the leading tank waves. The infantry, thus supported, was able to keep close behind the assaulting medium waves, and consolidate the ground as it was overrun. This formation and combination of the two arms, though not specifically new, was given new emphasis in the May offensive of this Division, and proved highly effective. In general support of the combined action of the armor and infantry, the divisional artillery gave sustained covering fire throughout. The assault guns of the medium tank battalions were consolidated into "batteries" and were used to reinforce the organic artillery. Those of the light tank battalions were used in their normal assault-gun role with the tanks and infantry.

Although the operations north of Rome cannot be strictly called a "pursuit" because no long-range mission had been assigned to the Division, experience in the driving of a rapidly withdrawing, disorganized enemy brought out several points of value to all commanders. In such an action in which the general disposition of the enemy is known, the organic vehicles of the reconnaissance battalion were found to be too vulnerable for employment in the front, unsupported by heavier armor. As a result, small "pursuit task forces," employing the medium tanks in the lead, were organized and used in this phase.

In Combat Command "A" three of these task forces were organized and operated. They consisted generally of a company of medium tanks, a company of infantry, a platoon of light tanks, a platoon of engineers, and a tank destroyer platoon. The infantry was carried on the medium tanks, and when resistance was met, the task force then assumed the formation described above for the general combination of infantry and armored action. As soon as the task force succeeded in breaking up the resistance, a similarly organized force would pass through the deployed force and take up the pursuit. The original task force would then reform for the advance and follow. The organization of these task forces, designed to change from pursuit columns to deployed attacking forces in the formation previously discussed, proved to be satisfactory and workable. The main purpose of their organization and scheme of action was flexibility, and the rapid conversion from pursuit to deployed action. Where the situation required the pursuit task forces to be separated on different routes of advance, each task force was again sub-organized so as to permit the same scheme of action as above, providing for conversion from pursuit column to an attacking force, with sufficient strength held out to pass through and continue the pursuit as soon as resistance has been broken by the deployed elements.

The tactical lessons resulting from the Division's recent action in Italy do not present any "new" or unusual aspects. On the whole, standard principles and doctrine were applied throughout and were sound and adequate. One outstanding conclusion, brought out in strong relief, as a result of the breakout attack from the beachhead, is that for all practical purposes in the infantry-tank combination, there is no real difference between armored infantry and foot troops of the normal infantry division. Both types operated with the tanks of the Division in this operation, and both participated in similar action. Though the two do present differences in some matters of equipment and transport, the main consideration is training. All infantry, armored or otherwise, must be trained in cooperative and coordinated action with tanks. The old concept of the artillery-infantry team, and the tanks as separate, independent force, has given way to the new and important concept of the infantry-tank-artillery team. The training must be kept abreast of the development of this present combination.

This all-important element of cooperative action and coordination of the two arms must be constantly achieved and maintained, and training must insure this result. Even with the detailed and meticulous training conducted before the initial attack, there were times during the advance when the proper combined action was not achieved. In the

offensive action of the 29th of May, poor coordination between the armor and infantry rendered the attack fruitless and costly. One result of the lack of close coordination on this day, despite the formation previously adopted to insure against it, was infiltration of enemy infantry behind the leading tanks, which resulted in our own infantry being attacked from flank and rear. This example is not by any means indicative that such conditions were other than exceptional, but it is given here to show how vital the infantry-tank coordination must be, and how essential it is for it to be constantly maintained.

Another lesson, though not new, resulted from failure to exploit the success of the final breaking of German resistance before Rome. In this period the maneuver of the armor was not sufficiently aggressive, and advantage of the enemy's condition was not fully taken. In the smaller-scale rear guard actions that developed, the effort to deploy, outflank, cut off, and annihilate the hostile delaying forces was not pushed to its possible lengths, and in some instances, enemy forces were defeated and driven into rapid withdrawal instead of being destroyed. These are not post-mortem criticisms of the commanders whose units fought such a successful campaign in the recent offensive in Italy. In all campaigns, and in all echelons of command, we learn by mistakes and can profit in the next action by those mistakes viewed in retrospect. The critical points in this discussion, as well as those which reflect the creditable and successful features of the action, are intended to be of interest and benefit to those units which had not the privilege of sharing in the Italian campaign, and in the capture of the first Axis capital to fall to our arms.

Japanese Tactics in Burma

From "Notes from India" in *The Fighting Forces* (Great Britain) June 1944.

JAPANESE forces have been severely punished at every stage of their advance up the Kabaw Valley and across the Upper Chindwin, writes a 14th Army observer.

In one brilliant delaying action, Indian troops of the Frontier Force Regiment caused havoc among recklessly advancing enemy before withdrawing under cover of carriers. In spite of their losses, including several officers, the Japanese came on suicidally and suffered for it heavily. It appears that the enemy has failed to realize how much we have learned of the art of jungle fighting, for he is using the old, familiar moves and jitter tactics. He mills round our posts at night, shouting and trying to attract attention. But fire discipline on the part of British, Indian, and Gurkha troops is excellent and these Jap patrols retreat with no information or retire into the hills and try other tactics. The British commander on this front stated that the enemy had underestimated our strength of purpose and determination to strike him wherever we found him. He said that our small patrols had successfully given the impression of being large ones, and on another occasion a company marched in to attack our forward troops and found themselves in a carefully laid trap. In the rout that followed, Gurkhas captured a Jap platoon commander. Not once, said the commander, have we been forced out of any position by direct Jap action, and our troops are at the top of their form.

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Infantry Division--Defense of an Island Coastline G-2 Phase

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THE purpose of this article is to demonstrate the various duties performed by the G-2 of a division before and during the occupation of a coastline defense position and while mopping up the enemy in adjacent territory. The division is relieving two divisions that have driven the enemy from a particular beachhead.

1. GENERAL SITUATION.—*a. Maps:* Situation Maps A and B.

b. Early in September, I Corps as part of the First Army had driven the enemy from that portion of the island of Santo and was disposed as shown on Situation Map A. The remnants of the enemy forces which did not escape by sea withdrew to the north along the coast and over inland trails as shown on Situation Map B.

2. SPECIAL SITUATION.—*a.* The 1st CT (-) 1st Inf Div by this time had arrived in the area of I Corps and had been attached to the 2d Inf Div to assist in the defeat of the enemy. The G-2 of the 1st Inf Div and one draftsman and one clerk from the G-2 section were attached to the 1st CT (-) when it went into action.

b. On 20 September the CG, 1st Inf Div, who was at his advance CP with Asst Div Comdr, G-2, G-3, Asst G-3, Div Surg, and Div Engr, received a directive from CG, I Corps, extracts of which follow:

"1st Inf Div relieves all elements I Corps as shown on Situation Map A, 1200, 25 September.

"CG 1st Inf Div assumes command all ground forces in area as of 1200, 25 September.

"1st Inf Div will organize and defend the coastline from CAPE SMITH to GYRO, both inclusive, and will clear all enemy from the area between the AMBER and MARBLE Rivers.

"Attachments as of 1200, 25 September.

"Co A, 3d Engr (C)
"5th FA Bn (-)
"11th FA Bn (-)
"SANTO native infantry battalion
"4 S/E [single engine] reconnaissance aircraft."

* * * * * * *

c. After consultation with his staff the CG, 1st Inf Div, issued his directive to G-2, G-3, Div Surg, and Div Engr, extracts of which follow:

"You know the Corps Commander's directive.
"The 1st CT (-) will relieve the 2d Inf Div.
"The 2d CT (-) will relieve the 3d Inf Div.
"Artillery remain present positions until further orders.
"Arrangements will be made for the protection of our flanks and rear.
"G-2, make necessary arrangements for employment SANTO native infantry battalion.
"EEI [Essential Elements of Information]:
"Will the enemy delay from positions north along the coast and along trails, if so where and in what strength?
"Will the enemy make another landing in this sector?"

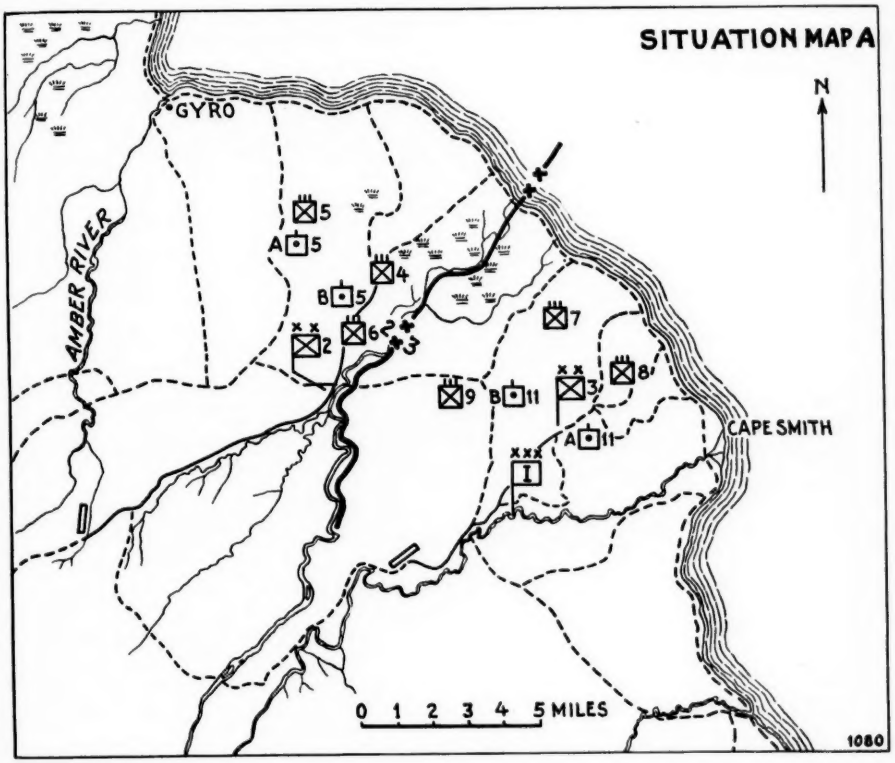
* * * * * * *

3. REQUIREMENT.—State the actions G-2, 1st Inf Div, took on receiving the division commander's directive.

4. A SOLUTION.—(Note: This may not be

the best solution but this is actually what took place.)

The 1st Inf Div had been in this particular theater for several months and all events had been pointing to the employment of the division on this particular island. Several weeks before the division was ordered to this island, G-2 and several other staff officers were sent as observers to study conditions on the island and learn as much as possible concerning the enemy as there were several officers on the island who had been in contact with the enemy on previous occasions. Prior to this visit to the island, G-2 had been collecting all the information available on the enemy order of battle, and maps and information of the terrain in all parts of the theater and particularly of this one island. G-2 had kept situation maps of the theater up to date, issued periodic reports, and made estimates of the enemy situation which kept the troops informed as far as information was available, as well as offering excellent practical training for himself and the personnel in the G-2 section.



When the 1st Inf Div was ordered to the combat zone, G-2 and two enlisted men of his section (one clerk and one draftsman) were attached to the leading CT. This provided G-2 with several days' experience in contact with the enemy prior to the arrival of the division commander and the balance of the forward echelon of the division headquarters.

Before the arrival of the advance echelon of division headquarters the G-2 contacted the G-2 of each of the infantry divisions already in the area and also the Corps G-2 and obtained from them all the latest information on the enemy and terrain. By means of a previously arranged code, periodic reports were sent back to the division (less one CT) which was still in a training area.

G-2 also obtained from the G-2's who were to be relieved, all information as to availability of maps and aerial photographs. The outstanding knowledge gained was that the maps were most inaccurate and that aerial photos took at least three weeks to obtain as there was no air force in that area that could provide quick photographic service.

One of the most important pieces of "advance planning" G-2 did before leaving the division was to select the equipment he and his two enlisted men were to take. The equipment consisted of one jeep, one portable typewriter, and two empty 81-mm shell cases which were fitted with rifle slings for carrying and in which were packed maps, drafting equipment, and stationery. As these shell cases were waterproof, they proved invaluable as containers for maps and stationery. Two small folding map boards were also taken. No equipment was taken that could not be carried by the two enlisted men.

By the time the division commander arrived and the corps directive had been received, G-2 had received all the latest information on the enemy and the terrain which was available and was prepared to give his estimate to the division commander, which was as follows:

"An enemy force estimated to be a battalion has withdrawn up the coast to the north and also up the trails between the AMBER and MARBLE Rivers.

"Enemy forces are known to be located and in strengths as follows:

Mouth of the MARBLE R 200 (Situation Map B)

MANTO 500 (40 miles N, MARBLE River mouth)

SUNJIN 2000 (60 miles N, MANTO)

LUCHOW 5000 (20 miles N, SUNJIN)

LUBAR 55000 (250 miles NE, LUCHOW)

"Sufficient shipping is immediately available to transport one division to any part of the theater.

"The terrain between the AMBER and MARBLE Rivers is mostly sago swamp with two or three principal trails which afford the only routes through this area. The track up the coast is very narrow and several river mouths must be crossed which afford good delaying positions for the enemy.

"The enemy can delay in successive positions along the coast and several villages along the trails, particularly at the intersections.

"He can also make a landing against our beaches with a division within forty-eight hours.

"Indications point to a delaying action up the coast and along the trails on our left flank but we must not overlook the possibility of another landing in this sector."

Having prepared his estimate as of 1200, 25 September, G-2 prepared his intelligence plan which in this situation only required the analysis and consideration of two Essential Elements of Information: (a) Will the enemy delay in successive positions, if so where and in what strength? and (b) Will the enemy make another landing in our sector, if so where, when, and in what strength? By looking at the maps, G-2 was able to pick specific localities where delaying positions could be expected and from which transports could leave which would carry landing parties. Collecting agencies available to obtain answers to our EEI in this situation were GHQ air force and ground patrols. After conferring with G-3 as to what units were available for the ground patrols, specific orders and requests were sent to the collecting agencies seeking information on these specific localities.

A series of OP's were established along the beach in the division sector, which were manned by subordinate unit personnel but were strictly division OP's from which periodic OP reports were submitted to G-2

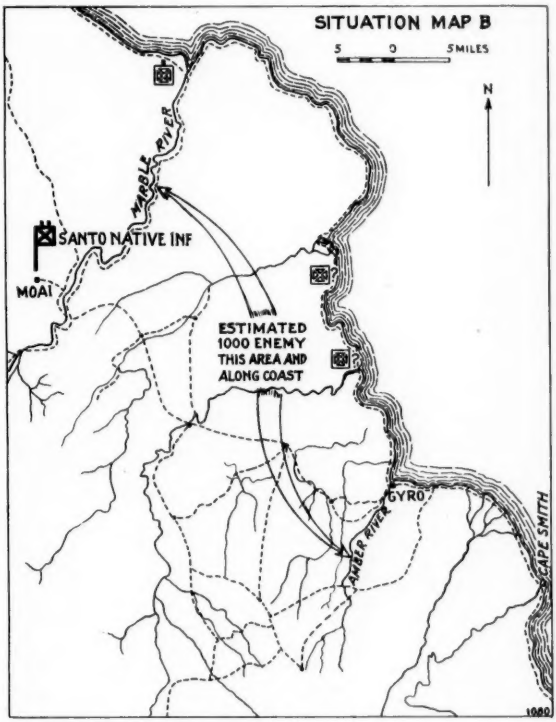
twice daily, covering all objects observed. This method provided excellent training in the operation of observation posts.

G-2 made the necessary arrangements for the operation of the Santo native infantry battalion, as its personnel were only valuable in the obtaining of information from the natives as to location of enemy groups which might be in the area between the Amber and Marble Rivers. These native soldiers would not seek combat with the enemy but were excellent marksmen and would ambush small parties of the enemy.

As other elements of the 1st Inf Div arrived in the sector and relieved units of the I Corps, G-2 made certain that the relieving S-2 received the latest information from the intelligence officer he was relieving.

Each infantry regiment was assigned a definite sector in which it was to obtain all information on the terrain and submit sketches by means of which the available maps were corrected. The engineer battalion normally expected to be charged with map corrections was busy on building roads and was not available for this work.

While G-2 was busy collecting, evaluating, and interpreting information from the collecting agencies he was also concerned with several other matters, one of which was the interrogation of prisoners of war of which twenty-three were turned over to the division by the 2d Inf Div at 1200, 25 September. Fortunately an interpreter was attached who had been attached to I Corps, and these prisoners were promptly questioned and evacuated within two days. As G-1 and the Provost Marshal of the division had not yet arrived, the responsibility of handling these and other prisoners fell upon G-2 pending the arrival of these two officers. Within a month four more interpreters were attached and one each was attached to the infantry regiments as they were still capturing enemy stragglers and finding enemy documents in their respective sectors. All prisoners were questioned promptly and evacuated and all documents were gone over hastily by the interpreters, then forwarded to First Army Headquarters one hundred miles to the rear.



A counterintelligence team consisting of one officer and four enlisted men was attached to the division before the last CT left the training area for the combat zone. When this team arrived it was assigned missions of checking old CP locations, making personnel investigations, checking violations of AR 380-5, and giving security talks on censorship, loose talk, and how to act if taken prisoner.

G-2 was further concerned with the super-

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vision of the liaison officers from lower and higher headquarters. It was necessary that they be provided with suitable office facilities and that they functioned properly. When a subordinate unit sent a liaison officer who could not perform his duties satisfactorily it would be necessary that a replacement be sent. Liaison officers were required to furnish their own transportation and an enlisted assistant. They were provided with separate telephones which took the load off the general staff telephones.

Then there was the problem of the native which had to be dealt with. Many of the natives had been forced laborers for the enemy and there might be several who were still friendly toward him. Provisions had to be taken that natives working around headquarters did not have access to the situation maps and records and care had to be taken about talking in their presence. The "jungle telegraph" is fast and positive. All headquarters installations were under guard twenty-four hours of the day either by section personnel or military police. Fortunately, on this island there was an organization of Europeans who controlled the native population and it was through this organization that all matters pertaining to natives were handled.

Finally, G-2 had to give consideration to his own section the remainder of which had by this time arrived, and two enlisted men had been evacuated because of sickness. It was necessary to keep replacements trained. Fortunately he had always kept fifty percent of the T/O strength additional in the section for just such contingencies, and it was now up to him to find further suitable replacements and to train them for G-2 work. These were obtained from the various units but not from their intelligence sections. Only in exceptional cases was a trained intelligence man ever transferred into the G-2 section, and then only when there was a chance for a promotion and the unit S-2 was in full accord with the transfer.

A standing operating procedure had been in existence in the G-2 section for several months, which provided for operating schedules for the personnel, handling of messages, filing, posting of maps, and other operations within the section itself.

To summarize, we will list the activities of G-2 in this particular operation:

a. He made personal visits to G-2's of the divisions and corps which his division was to relieve and collected all information available on the enemy, terrain, map supply, and aerial photographs.

b. He had the G-2 situation map well up to date when his division commander arrived.

c. He gave the division commander the G-2 estimate of the situation.

d. He prepared his intelligence plan and issued orders and requests to the collecting agencies.

e. He established division OP's on the coast in the division sector.

f. He made necessary arrangements for the employment of the Santo native infantry battalion.

g. He made security arrangements for division headquarters against natives.

h. He made provisions for the correction of maps and controlled their distribution.

i. He made provisions for handling prisoners of war and the use of the prisoner-of-war interrogation team.

j. He provided for the employment of the counterintelligence team.

k. He supervised the operations of the liaison officers.

l. He checked on his own section operation and took necessary steps to keep it at full strength and operating smoothly.

m. While G-2 was doing the things listed above he was also looking ahead, planning and anticipating what the next operation of the division might be, collecting, evaluating, interpreting, and disseminating intelligence so he would be prepared at any time to present to the division commander an estimate of the enemy situation based on the last known enemy information.

G-2 is a busy individual. He must keep several jobs going at the same time, and when one phase of an operation ends he starts all over again.

Know Your Fuels and Lubricants

Captain G. B. Conner in collaboration with Major J. T. Bugbee, Maintenance Division, Army Service Forces.

IF a mess sergeant used Grease, General Purpose No. 1 (U.S. Army 2-107), to fry your breakfast eggs, you'd probably have him court-martialed by lunch time. But if a motor sergeant used the same grease to lubricate the posterior of a DUKW, you'd probably pin the good conduct medal on him. Actually, damage to the war effort in the second instance would be far more grievous, because the poor DUKW would soon need a new rear end whereas your original stomach would eventually pull through.

All of which leads around to the point that if you aspire to be a worthy commander or subordinate in a modern mechanized army you've got to know your oil. This doesn't mean that you should attempt to become a lubrication expert, but you should have more than a bowing acquaintance with the more commonly used fuels and lubricants for military equipment.

Sugar and salt look very much alike—but if you can imagine sugar on steak or salt in coffee you can get some idea of what happens to equipment when the wrong fuel or lubricant is used.

War Department Lubrication Orders (WDLO's) and Technical Manuals prescribe the types of fuels and lubricants for each piece of military equipment. But situations do arise in which operating personnel ignore instructions, or in which specified fuels and lubricants or WDLO's and TM's are not available. Under such circumstances a knowledge of fuels and lubricants or sound judgment must be used to prevent serious damage to equipment. To help prepare commanders and subordinates for such eventualities the following useful facts about military fuels and lubricants have been assembled:

Gasoline.—There are four types of gasoline available for military purposes. One is what might be called an "old fashioned" gasoline. No anti-knock compound (lead) has been added to it. It has a clear, white color and an octane (anti-knock) rating of 62. This gasoline is for use in stoves, lanterns, torches, and the like which have not been designed or converted for use with leaded gasoline. It can also be used when available in some of the smaller gasoline engines on air compressors, generator sets, and the like which are built for use with unleaded gasoline. It should not be used in trucks, tanks, half-tracks, or any auxiliary engines designed for use with higher octane (leaded) gasolines except when preparing for storage or shipment. Its nomenclature is: Gasoline (Unleaded and Undyed), (U.S. Army 2-116).

Two grades of vehicular gasoline are available. Both contain anti-knock compound (lead). They are similar to the two pre-war grades of gasoline available at filling stations. One of them is known as Motor Fuel (All Purpose) (U.S. Army 2-103 B). It has excellent warm-up, acceleration, power, anti-knock, and anti-vapor lock characteristics. It has a red color and an octane rating of 80. This gasoline is for use in all vehicles in the combat zone and all combat vehicles in the zone of the interior.

The other grade of vehicular gasoline is known as Motor Fuel—72 Octane (U.S. Army 2-114 A). It is for use in non-combat vehicles in the zone of the interior and for those auxiliary engines for which it is specified. This gasoline is provided because it is entirely satisfactory for the purposes for which it is specified and because it helps to conserve the supply of 80 octane gasoline which is scarce and urgently needed for combat.

The remaining type is known as aviation gasoline and comes in several grades. It is not available nor prescribed except for airplanes and high-speed crash boats. The fact that aviation gasoline and the chemicals used in its production are critically scarce makes it imperative not to use it in vehicles. Motor vehicles are not designed to use aviation gasoline and damage to their engines will result if it is used.

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Diesel Fuel.—The fuel available for all high-speed automotive Diesel engines and all stationary and marine Diesel engines unless excepted by approved tests is: Oil, Fuel, Diesel, for High Speed, Automotive Type Diesel Engines. (USA 2-102C).

Lubricating Oil.—While there are various lubricating oils with which commanders and subordinates should be familiar, there is one with which they should be thoroughly familiar. It is Oil, Engine (U.S. Army 2-104 B) which is used for the lubrication of certain artillery equipment and all internal combustion engines except those on aircraft. It is furnished in SAE 10, 30, and 50 grades only. This "most widely used oil in the Army" has a peculiarity which nearly every member of the armed forces should understand. The peculiarity is that the oil turns black quickly after it is placed in an engine. This is due to the fact that a special chemical has been added to make the oil act as a cleaner as well as a lubricant. Because of its cleaning action the oil holds carbon in suspension which would normally collect on rings, pistons, and other internal parts of an engine. In absorbing carbon, the oil turns black, which it should. Because it has turned black, many individuals are inclined to drain it out of the crankcase, although its lubricating qualities haven't been impaired in the slightest. This is an utter waste of valuable oil. With this oil, which is called a "detergent oil," color cannot be used as a basis for determining when it should be changed. It must be changed strictly on a mileage or hourly basis as specified in War Department Lubrication Orders.

Gear Lubricants.—The problem of gear lubricants is simplified by the fact that a single type takes care of the lubrication of all gear units including hypoid type differentials, steering gears, transmissions, transfer cases, and the like. It is known as Lubricant, gear, universal, and comes in three grades (SAE 75, 80, and 90). There shouldn't be any problem as far as gear lubricants are concerned since only a single type is available. But—there is a problem. It is brought about by the fact that oil seals eventually wear out and lubricants begin to leak. Instead of replacing seals when they wear out many individuals start crying for a heavier gear lubricant—usually SAE 140 which used to be available. The truth is that if SAE 140 were available it would leak as badly as SAE 75, 80, or 90. This is because a heavy lubricant develops a higher operating temperature than a light lubricant. When this happens, the heavy lubricant actually becomes thin and leaks rapidly. When leakage occurs, the thing to do is to replace oil seals and replace them properly. Asking for a heavier lubricant is a waste of time because none is available, and if it were it wouldn't solve the problem anyhow.

Greases.—Nine types of grease are required to meet most military needs. Although the number of types is large, the number of things that need to be known about them is quite small. This is because War Department Lubrication Orders and Technical Manuals provide clear information as to where, when, and how each shall be used. In other words, if instructions are followed no difficulty will be encountered. But if they are ignored, serious damage to equipment may result. For example—the three most widely used greases have the same basic nomenclature; i.e., Grease, general purpose. The three types are identified by grade numbers following the basic name or nomenclature. No. 0 and No. 1 are for the lubrication of vehicle chassis and certain artillery equipment. No. 2 is made especially for lubricating wheel bearings. To use No. 0 or No. 1 or any grease other than No. 2 for wheel bearing (which might occur through an oversight, negligence, or indifference to instructions) is to invite disaster and ruined bearings. Similarly, No. 2 grease will ruin bogie bearings, universal joints, and certain bearings for which other greases are specified.

For lubricating ball and roller bearings that operate at high temperatures, such as clutch pilot bearings, Grease, Ball and Roller Bearing is available. However, it is gradually being replaced for this purpose by Grease, General Purpose, No. 2, mentioned above.

Naturally, Grease, Water Pump and no other should be used for the old fashioned

THINGS EVERYBODY SHOULD KNOW ABOUT FUELS AND LUBRICANTS

The Product	*What You Should Know About It*
Gasoline (Unleaded and Undyed) (U. S. A. 2-116)	It is an unleaded gas for use in lanterns, stoves, and the like. Don't use it in vehicles except when preparing for storage or shipment.
Motor Fuel (All Purpose) (U. S. A. 2-103B)	A high quality gas with an octane rating of 80. For use in all vehicles in the combat zone, and all combat vehicles in the zone of interior.
Motor Fuel-72 Octane (U. S. A. 2-114A)	Used in all non-combat vehicles in the zone of interior to conserve the supply of 80 octane gas.
Aviation Gasolines (All Types)	They are designed for aircraft engines. Don't use them in vehicles or other ground engines.
Oil, Engine	For lubricating internal combustion engines (except aircraft engines) and certain artillery equipment. Cleans as well as lubricates. Turns black quickly, but its lubricating ability isn't impaired. Change on a mileage or hourly basis only—never a basis of color.
Lubricant, Gear, Universal	The only type available. Comes in three grades: SAE 75, 80, and 90. If it leaks, don't ask for SAE 140 as it isn't necessary and not available. Change the oil seals.
Grease, General Purpose, No. 2	For lubricating wheel bearings at all temperatures. Don't use any other grease or grade.
Oil, Lubricating, Preservative, Special (U. S. A. 2-120, formerly AXS-777)	For lubricating small arms. Provides day to day protection against rust and corrosion. Now available in convenient two-ounce can which will fit into a soldier's cartridge belt.
Cleaner-Rifle Bore (U. S. A. 2-117, formerly RIXS-205)	For cleaning small arm bores. Dissolves primer salts and absorbs water. Has a little rust preventive ability, but should be followed by an application of the above preservative. Also comes in a convenient two-ounce can.

gland type water pumps as it is the only one that is treated to withstand hot water. The other special purpose greases available are: (1) Grease, Lubricating, Special, for fire control systems and special bearings. (2) Grease, (O. D., No. 00), for lubricating certain artillery gun carriages in the winter or in temperatures below + 32°F. (3) Grease, (O. D., No. 0), for lubricating certain artillery gun carriages in the summer or in temperatures above + 32°F.

The uses mentioned for all of the above greases are only some of their principal uses. They have many other applications as specified in War Department Lubrication Orders and Technical Manuals.

Preservative Oils.—Rust and corrosion are two of the principal enemies of a mechanized army. In this war they have taken a big toll of equipment on our long lines of communication across the oceans, in amphibious and jungle operations, and in exposed storage depots throughout the world. There is only one answer to this destruction, and that is the proper application of preservative oils and compounds. The Army has supplied the means in the form of five types of preservatives. It only remains for commanders and

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subordinates to see to it that they are employed, and that each is employed for the specific purpose for which it is intended. Here are the preservatives and their principal uses: (1) Oil, Lubricating, Preservative, Special (U.S. Army 2-120 or AXS-777). This is one of the most important and most widely distributed of the preservatives because it is designed especially for the lubrication and protection of small arms. Under normal conditions it will protect small arms against rust or corrosion from day to day. In addition to larger cans, it is now supplied in a convenient two-ounce can that will fit into a soldier's cartridge belt. It supersedes Oil, Lubricating, Preservative, Light which had the same good rust prevention characteristics, but was somewhat heavier and unsuitable for temperatures below 0°F. A wet or dirty weapon should be cleaned in accordance with instructions with Cleaner, Rifle Bore, before applying this preservative. (2) Oil, Lubricating, Preservative, Medium, (USA 2-122, formerly Ord AXS 674). This is a heavier preservative than (1) above, and will give protection for a longer time. It is used on small arms in landing operations and in extremely humid climates. It is also satisfactory for preservation of tools and similar equipment during short term storage. (3) Oil, Engine, Preservative (Ord AXS 934). This is a special oil for the protection of internal combustion engines and is used primarily to prepare them for storage or shipment. (4) Compound, Rust Preventive (Light —USA 2-84B and Heavy—USA 2-82C). Unlike the preceding preservatives, these do not have lubricating ability. They are used solely for the protection of metal surfaces during shipment or storage. These compounds must be heated prior to application, which may be done by brushing, spraying, or dipping. They should never be diluted before applying. *Light* is used for short term storage or shipment when the surfaces will not be exposed to the elements. *Heavy* is used for long term storage of a year or more or for shorter periods when the surfaces will be exposed to the elements. (5) Compound, Rust Preventive, Thin Film (AXS-673). This preservative is for the protection of exposed, unpainted metal surfaces during shipment or long term storage and is not a lubricant. The compound dries to a tough, thin tacky film, and it should be used only on surfaces from which it can be easily removed by scraping and swabbing with Solvent, Dry Cleaning. It is not used in gun bores, breech mechanisms, and other mechanisms from which it would be difficult to remove.

Recoil Oil.—There are only three types of recoil oils. No problems should be encountered with them as their applications are clearly specified in WDLO's and TM's. These oils are used principally in recoil and other hydraulic mechanisms. (1) Oil, Recoil, Light (U.S. Army 2-36 D). A straight mineral oil of low viscosity which is satisfactory at all temperatures in the mechanisms for which it is prescribed. (2) Oil, Recoil, Heavy (U.S. Army 2-96 A). This is a straight mineral oil with a higher viscosity and pour point than *Light* or *Special.* Procurement has been stopped, and it is being replaced with Oil, Recoil, *Special* as stocks become depleted. (3) Oil, Recoil, Special (Ord AXS 808). A treated mineral oil with a low pour point. It is satisfactory for use at all temperatures in mechanisms for which it is prescribed.

Hydraulic and Shock Absorber Oils.—The three types of hydraulic and shock absorber oils are critical items and should be used for the purpose for which they are intended: (1) Oil, Hydraulic (U.S. Army 2-79 A). A light mineral oil with a low pour point for use in hydraulic mechanisms as specified. *Don't* ever use it in hydraulic brakes. (2) Fluid, Hydraulic Brake (U.S. Army 2-111 A). A non-mineral fluid for use in hydraulic brake systems and other specified cases where a mineral oil cannot be used. (3) Fluid, Shock Absorber (Light or Heavy) (U.S. Army 2-112). There are two grades of this fluid: The light grade is a mineral oil having a low pour point for use in Delco shock absorbers and other units as prescribed; and the heavy grade is a blend of vegetable oil for use only in Houdaille shock absorbers.

Cleaners.—Two types of cleaners are available. (1) Solvent, Dry Cleaning (Federal

P-S 661 A). This is a light petroleum distillate for cleaning fabrics and machine parts. Diesel fuel may be used as substitute in an emergency. *Never* use gasoline for cleaning. As is well known, it is highly inflammable, and the anti-knock chemicals (lead) are poisonous. (2) Cleaner, Rifle Bore (U.S. Army 2-117 or RIXS-205). While not a lubricant in any sense of the word, this is one of the most important items used in the Army. It is designed specifically for cleaning the bores of small arms. It has the ability to dissolve primer salts and absorb water. This cleaner is now supplied in a convenient two-ounce can that will fit into a soldier's cartridge belt. It has some rust preventive ability, but it is safer after the cleaner is applied to coat the gun bore with Oil, Lubricating, Preservative, Special, mentioned earlier in this story.

While the number of fuels, lubricants, preservatives, and cleaners appears quite large, their application is simplified by the concise instructions in War Department Lubrication Orders and Technical Manuals. The well-being of the entire military machine is positively dependent upon close adherence to the instructions. There are few ways in which commanders and subordinates can do more to further the war effort than by exercising critical supervision over the employment of the Army's fuels and lubricants and in seeing that they are applied regularly and consistently as prescribed.

Japanese Interception Methods

From an article in *Air Force* July 1944.

JAPANESE fighter pilots used many kinds of tactics, some good and some poor, in their attempts to break up Allied bomber attacks in the Gilbert-Marshalls campaigns.

In attempts to break up formations of B-24's, enemy fighters often would try tricks and feints. Sometimes a few fighters would perform acrobatics to attract attention while other planes attacked from another side. An enemy fighter on the flank of an AAF formation would feint a pass while another fighter would dive from overhead. Enemy fighters would stay off on one flank while another was waiting up sun ready to attack. Three enemy fighters would take a position on a flank while three others went up sun. One fighter would dive out of the sun and, after the pass, would take a position on the flank while a plane from the flank went up into the sun to take the first fighter's place.

Now and then, the Japs would fly a mile or so ahead of a formation of Mitchells, slow roll and make shallow dives on the B-25's from about 1,000 feet, turning sufficiently to fire on the whole formation. Jap fighters occasionally would start from about 2,000 yards out, come within 1,000 yards, and break off into split S. ["Split S" is a maneuver used for rapid breakaways. It is done by dipping the wing of the ship perpendicular to the ground and kicking bottom rudder causing the ship to skid down and away. Used for a quick reversal of direction.] Frontal attacks usually started from about half a mile ahead and 2,000 feet above. The enemy fighters would come down in a shallow dive, split S and half roll, with a breakaway at two o'clock. [Breakaway at two o'clock has reference to friendly viewpoint. Direction is always given with reference to friendly position.]

In the latter part of the campaign the Japs used "pacers" which stood off on one side of the AAF formations and signalled to fighters as well as giving directions to anti-aircraft installations as to altitude, course, and speed of our aircraft. In this phase of the battle there was considerable air-to-air bombing by the Japs.

AAF crews were impressed throughout the campaign by the excellent teamwork between Jap fighters and their antiaircraft.

XUM

Foot Cavalry

MAJOR JAMES W. EDWARDS, *Infantry*
Instructor, Command and General Staff School

THE present-day infantry division can quickly become a motorized infantry division by the simple procedure of attaching enough additional quartermaster truck companies to carry the men marching on foot. However, the demand for quartermaster truck companies during combat often exceeds the supply, so it may become necessary for an infantry division to move without the aid of extra quartermaster transportation. By the proper use of its organic transportation, an infantry division can truly become a modern "foot cavalry" unit and enjoy the same advantage in mobility over enemy infantry divisions that those famous regiments of General "Stonewall" Jackson enjoyed over the Federal infantry units of their day.

To transport an infantry division by its organic transportation it is necessary to move by echelon in two or more trips. To accomplish this with the least amount of confusion and disruption possible, it is necessary to have a Standing Operating Procedure for movement by organic transportation. The term "shuttling" is often used to describe this type of movement. "Shuttling" unfortunately implies, and the movement too often results in, an uncoordinated migration in which troops dump loads indiscriminately and "pile into" whatever trucks they can get hold of. At the completion of the movement trucks and supplies are unscrambled back to their own units. A movement by echelon, on the other hand, is controlled in time and space and the balance between troops and supplies moved in each trip is carefully coordinated. Definite assignment of transportation to move specific foot troop units is made. Therefore, the term "Motor Movement by Echelon" is considered to be a more appropriate title for an SOP for motor movement by organic transportation than is the term "Motor Movement by Shuttling."

A motor movement by echelon has both advantages and disadvantages as compared to an ordinary movement on foot. For a march of any considerable distance, the motor movement saves time and conserves the strength of the foot troops, and the greater the distance to be covered, the greater the advantages. On the other hand, moving a unit by echelon divides its forces and makes it subject to defeat in detail. Also, normal supply routines are temporarily interrupted.

MOTOR MOVEMENT NO. 1

An SOP should contain several contingent plans. For purposes of illustration let us briefly discuss one such plan, which we shall call Motor Movement No. 1 (MM 1). This plan (see Figure 1) is based on the following conditions:

a—Combat Teams 1 and 2 will move complete in the first trip.

b—Combat Team 3 and the division troops, which comprise the division less three combat teams, will move in the second trip.

c—All of the division and its normal supply loads will be closed in the new area at the end of the second trip.

d—Additional transportation for carrying the foot troops of units moving in the first trip will be furnished by units which are to move in the second trip.

e—Transportation for the foot elements of Combat Team 3 will be furnished by Combat Teams 1 and 2 dumping some loads in the new forward area.

f—Security for the movement as a whole will be provided by the division reconnaissance troop.

BASIC PRINCIPLES OF MOVEMENT BY ORGANIC TRANSPORTATION

When moving a division by echelon the following basic principles should be observed:

a—Do not deprive units of their battlefield mobility by taking from them their prime movers, weapons carriers, essential command and reconnaissance vehicles, communications trucks, or those vehicles needed for motor and other maintenance.

Motor Movement No. 1

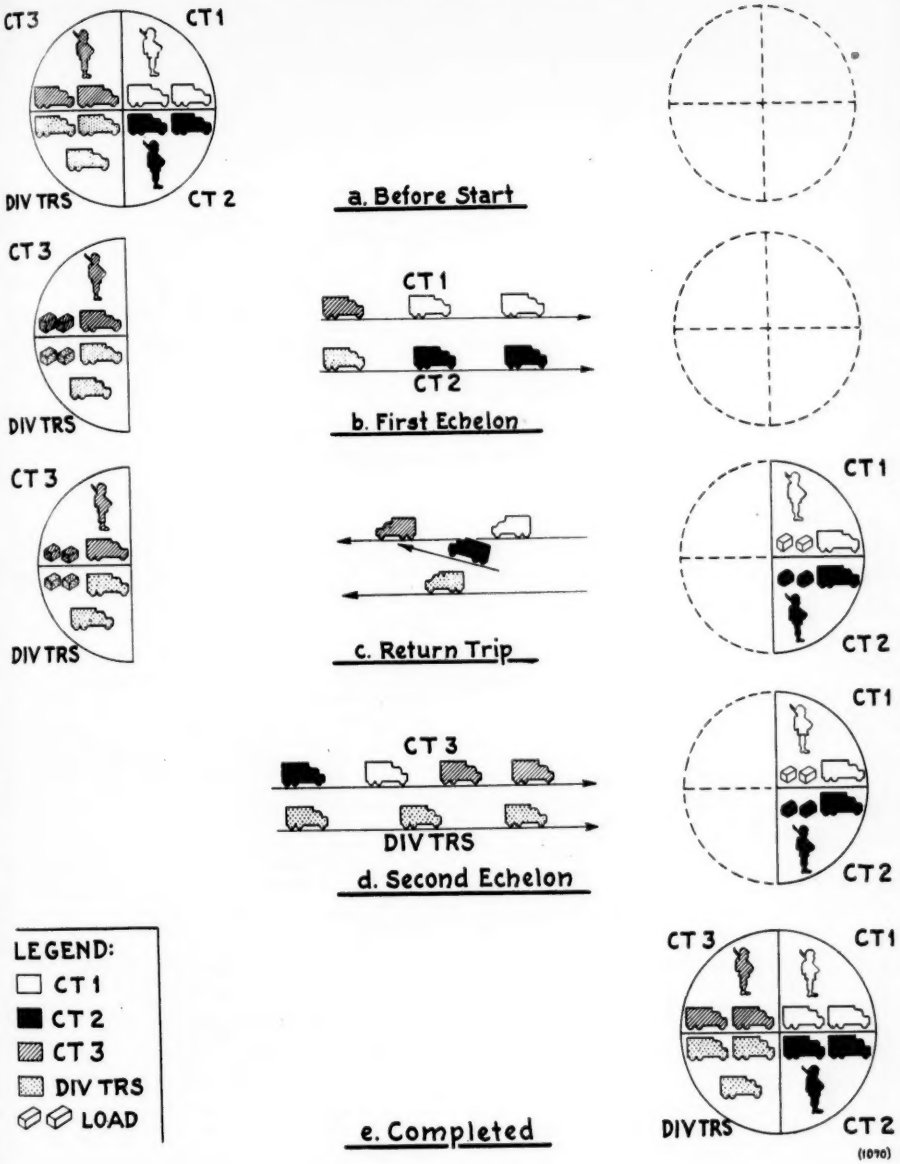

FIGURE 1.

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b—Make it possible for units moving in the first trip to take enough ammunition to permit them to operate until resupply can be made. Leave them at least two-thirds, preferably all, of their ammunition vehicles.

c—Employ vehicles taken from a unit (to move foot troops) as a group instead of splitting them up and sending a few to each of several units. By doing this, control and maintenance of the vehicles is facilitated. Also, use the vehicles of units within a combat team to assist in moving their own combat team mates. The only exception is the division quartermaster truck company which is so organized that it can be split into platoons of sixteen trucks and sections of eight trucks.

d—Don't call on a unit for the maximum number of trucks available. Allow a five to ten percent leeway to cover vehicles which may be deadlined, away on other missions, or otherwise unavailable. In this respect it is also poor policy to use the kitchen trucks of the medical battalion, because they are the only source of hot water for the wounded.

e—Avoid dumping the basic loads of a large number of vehicles in the forward, exposed, new bivouac area.

f—Arrange for adequate security for the movement, providing for not only the protection of the columns in movement but also for the old and new bivouac areas.

WORK SHEET—AVAILABILITY OF MOTOR TRANSPORT FOR TROOP MOVEMENT[1 2 3]

EXAMPLE OF WORK SHEET SHOWING AVAILABILITY OF CARGO TRUCKS (1½ & 2½-TON) IN THE INFANTRY DIVISION FOR MOVEMENT OF FOOT TROOPS.—This table shows a priority which might be established within a division for the availability of organic motor transportation of units scheduled to be moved in the second echelon, to be used for movement of foot troops of the first echelon. The table can also be used in determining the priority of transport to be used in motorizing an infantry unit in reserve, or for cargo hauling.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Priority	Normal Use	3 Inf Regts (each)		3 FA Bns 105-mm How (each)	FA Bn 155-mm How	Engr Bn		Med Bn		QM Co	Sig Co		Total		Aggregate
		1½-ton	2½-ton	2½-ton	2½-ton	1½-ton	2½-ton	1½-ton	2½-ton	2½-ton	1½-ton	2½-ton	1½-ton	2½-ton	
1	Cargo Trks									48				48	48
2	Pers & Orgn equipment	1	2	1	1		1		6			2	3	19	22
3	Am & Pion tools	3											9		9
4	Ki Trks		19	5	5		4	2	3	1		2	2	87	89
5	Engr tools						36							36	36
6	Assault boats						1							1	1
7	W Sup						3							3	3
8	Am & AT mines	2	9	15	9		3						6	84	90
9	Comd & Opns	1		1	1					1	1		4	5	9
10	Med Sup								3					3	3
11	Sig Com		1	1	1						3	10	3	17	20
12	Atchd Med		1			1							1	3	4
	TOTAL	7	32	23	17	1	48	2	12	50	4	14	28	306	334

[1] The availability of cargo Trks & priority of such availability are command decisions.
[2] Prime movers omitted. See Par 336, FM 100-5.
[3] Maintenance vehicles omitted as they usually accompany motor vehicles of the unit.

FIGURE 2.

AVAILABILITY OF ORGANIC MOTOR TRANSPORTATION

Before definitely designating the trucks to be used in moving the foot troops in MM 1, we must have some idea of the availability of the organic transportation of the various units of the division. A Work Sheet (see Figure 2) is a very convenient form for tabulating these data.

In the infantry division there is a total of 1,440 vehicles. Of these, 897 are ¼ and ¾-ton which we will not consider for moving foot troops, for two reasons. In the first place, many of them are weapons carriers, command and reconnaissance vehicles, ambulances, etc., which cannot ordinarily be diverted from their normal functions. And in the second place, their troop-carrying capacities are so low that to use many of them for that purpose would unduly increase the time length and road space of our columns.

Of the remaining vehicles of the division, those of 1½-ton size and larger, we have omitted from the Work Sheet prime movers and motor maintenance vehicles for obvious reasons. This leaves a total of 334 vehicles which can be used for motorizing foot troops. Remember that this is only one example of how such a Work Sheet may be drawn up. These figures probably won't apply exactly to your own unit because you will have your own ideas on the availability of organic transportation, but they give us a common basis for figuring the data for this MM 1. Note that priorities have been indicated in the Work Sheet. These will not have much value in planning the movement of the whole division by echelon, since so many vehicles are needed, but it may be of value in other situations when selecting the trucks needed to motorize an infantry battalion or even a regiment.

Data

The following data are used for purposes of illustration only, and are given here merely for the purpose of explaining the method used in determining the number of trucks shown in Figure 3.

a—The infantry division used is assumed to be ten percent under T/O strength. All units of the division are assumed to be motorized with the exception of the rifle regiments. Within the rifle regiments all units except rifle battalions are assumed to be motorized. The men on foot in a rifle battalion are figured as 575, and those in a regiment, three times that number or 1,725. Each rifle company has 160 men on foot. To motorize a rifle regiment it will take sixty-nine 2½-ton trucks if each 2½-ton truck is assumed to be able to carry twenty-five men. In your division the men on foot in a rifle battalion may be much greater than 575. Also, some of the men in the regimental headquarters company, medical detachment, etc., may be on foot. In making your SOP, the actual strength reports of your units will have to govern.

b—The SOP gives the following organization for combat teams:

1 Rifle Regt
1 Bn of Field Arty
1 Plat of a Combat Engr Co
1 Med Collecting Co (minus) comprising approximately half the men and vehicles of the company
Det from the Signal Co (1 officer, 10 EM, and 1 vehicle)

Therefore, to motorize a combat team it is only necessary to motorize the rifle regiment. This requires sixty-nine 2½-ton trucks.

c—According to the SOP the following prescribed loads are carried by the quartermaster company of the infantry division:

Items of Prescribed Load	*2½-ton Trks and 1-ton Tlrs*
Class I—Rations (32 tons 10-in-1 ration)	10
Class III—(Including 4,000 gals gasoline)	5
Class V—Antitank mines (520 cased)	1
Total	16

Thus of the forty-eight 2½-ton cargo trucks in the quartermaster company, 32 of them (two platoons of sixteen trucks each) are without prescribed loads.

Maximum Number of Trucks Available

In MM 1 we are planning to move Combat Teams 1 and 2 complete in the first trip. Since we assume that sixty-nine 2½-ton trucks are required to motorize a combat team, we will

therefore need 138 trucks to move the foot troops in the first echelon. Since Combat Teams 1 and 2 are taking with them all their supplies and equipment, we can only call upon Combat Team 3 and the division troops for these 138 trucks. From our Work Sheet we see that the following maximum number of 2½-ton trucks are available from the units indicated:

Unit	*Number of 2½-ton Trks*
QM Co	50
Engr Bn	40*
3d FA Bn	23
4th FA Bn	17
3d Inf	32
Med Bn	9**
Sig Co	14
	185

Since we only need 138, it will be possible to allow each unit a little leeway and not call on any of them for every available truck.

*Forty-eight less eight platoon and squad tool trucks belonging to the two engineer platoons moving with Combat Teams 1 and 2.

**Twelve less three kitchen trucks.

MOTOR MOVEMENT BY ECHELON, INFANTRY DIVISION

ASSIGNMENT OF MOTOR TRANSPORT FOR MOVEMENT OF FOOT TROOPS
(MM 1)

	1	*2*	*3*	*4*	*5*
1	*Unit from which transport is furnished*	*Number of 2½-ton trucks provided and unit to which furnished* [2]			
		1st Echelon		*2d Echelon*	*Alternate 2d Echelon*
		1st Infantry	*2d Infantry*	*3d Infantry*	*3d Infantry*
2	1st QM Co	48			[3] 31
3	1st Engr Bn		20		
4	1st Med Bn	5			
5	1st Sig Co		3		
6	1st FA Bn			11	
7	2d FA Bn			11	
8	3d FA Bn		21		
9	4th FA Bn	16			
10	1st Inf			23	19
11	2d Inf			24	19
12	3d Inf		25		
13	[1] TOTAL	69	69	69	69

[1] Total number of trucks required is based on:
Total foot troops in each infantry regiment—1,725 (an arbitrary figure not to be applied to any specific unit.)
Passenger capacity of trucks: 2½-ton—25; 1½-ton—15.

[2] See Figure 2, Work Sheet, for availability of trucks for troop movement.

[3] See page 55 for prescribed loads of QM Co. Number of trucks used is based on number without prescribed loads (32).

NOTE: A variation in the above plan would be to use trucks of the 1st QM Co to move foot troops in both the 1st and 2d echelons, and then have them return to pick up their prescribed loads and complete their movement in the 3d echelon. Their availability for troop movement in both echelons would be dependent upon the supply situation.

FIGURE 3.

Trucks for the First Echelon

Figure 3, under the column headed "1st Echelon," shows one possible solution for obtaining the trucks for the first echelon.

Trucks for the Second Echelon

Two possible plans for the assignment of trucks to move foot troops of the second echelon are shown in Figure 3. We are moving Combat Team 3 and division troops in the second echelon, so we will need a total of sixty-nine trucks for the foot troops of Combat Team 3. In our first plan for the second echelon, we are assuming that none of the quartermaster company trucks will be available. This is the "worst possible case" and assumes that the thirty-two quartermaster company trucks without prescribed loads are tied up in moving the division rear echelon, motorizing any men on foot in other divisional units, going back to supply points, or are otherwise not available for troop movement. Since Combat Team 3 and the division troops are moving in this second echelon and must close all their personnel and equipment into the new area at the end of this echelon, we can only call upon Combat Teams 1 and 2 for the sixty-nine 2½-ton trucks needed to move the foot troops of Combat Team 3. The maximum number of 2½-ton trucks available in each combat team is as follows:

Unit	*2½-ton Trucks*
Inf Regt	32
FA Bn (105 How)	23
Combat Engr Plat	4
	59

The total for the two combat teams is 118. Since we only need sixty-nine, it will not be necessary to use all the trucks of any particular unit. One solution for obtaining the number of trucks assigned to the second echelon is shown under the column headed "2d Echelon" in Figure 3. This, of course, means that Combat Teams 1 and 2 must dump some loads in the new area in order to furnish the above trucks. The 138 trucks which were "loaned" to Combat Teams 1 and 2 for the first echelon movement will be returned to Combat Team 3 and division troops to pick up their normal loads and move with the second echelon.

A second or alternate plan for the second echelon is shown in Figure 3 under the column headed "Alternate 2d Echelon." In this plan it is assumed that the thirty-two quartermaster company trucks without prescribed loads are still available for moving the foot troops in the second echelon. Thirty-one of these have been used and Combat Teams 1 and 2 have been called on to furnish nineteen each. Although Figure 3 shows these nineteen trucks per combat team as coming from the infantry regiment, actually the combat team commander might elect to use some field artillery or even engineer vehicles.

Other Possible Plans

A good SOP for motor movement by echelon should contain several plans. MM 1 is an example of only one such plan. Listed below are brief outlines of several other plans:

a—MM 2.—Combat Teams 1, 2, and 3, each less three rifle companies, move in the first echelon. The three rifle companies per combat team are to protect the old bivouac area and will move in the second echelon with the division troops.

b—MM 3.—A modification of either MM 1 or MM 2 which detrucks the foot troops of the first echelon several miles short of their destination so that the trucks carrying them can turn around and go back to pick up the foot troops of the second echelon which have already started marching on foot. This MM is very useful when time for the movement is limited.

c—MM 4.—As suggested by the note to Figure 3, a modification of either MM 1 or MM 2 which allows the move to be completed in three instead of two echelons. However, if the movement is restricted as to time—for example, if it must be made under cover of darkness—we must be sure that the third echelon movement can be completed in the time specified.

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SUMMARY

A motor movement by echelon, of course, will not be undertaken if there is a possibility that the enemy will interfere with the movement before it is completed.

An SOP for motor movement by echelon should include several plans. Each plan should include at least the following items:

a—A plan number (MM 1, MM 2, etc.).

b—The exact composition of the division security force.

c—The specific units to move in each trip (echelon).

d—The definite assignment of the vehicles needed by the foot elements to specific foot units in each echelon.

For an unforeseen situation it is easier to modify an existing plan than it is to create an entirely new one. This article only attempts to show one method of preparing an SOP for motor movement by echelon with organic transportation. An infantry division that has prepared an adequate SOP for motor movement by echelon using its organic vehicles, and has practiced the SOP sufficiently to have "ironed out" all the errors, becomes truly a modern version of General Jackson's famous "foot cavalry."

Bridge-Erecting Trucks

Digested at the Command and General Staff School from an article in *Army Ordnance* July-August 1944.

IN recent maneuvers, the 22d Armored Engineer Battalion built a 330-foot bridge of rubber and steel in three hours and two minutes.

This amazing achievement is accomplished with the help of an entirely new type of equipment carrier and erecting unit, bringing into use longer, sturdier pontons, improved steel saddles, and wider treadways. The special steel carrier body and its 8,000-pound-capacity crane are especially built for mounting on a Brockway Army truck. Each big truck carries pontons, steel saddles, and four 2,000-pound treadways for thirty feet of bridge. They are thirty-one feet long, nine feet high, and weigh twenty-six tons loaded, but they are fast and easy to handle.

The crane is fourteen feet long, hinged at its base, and hydraulically controlled. Swinging from its traveling position along the outsides of the body, it picks up the heavy steel treadways two at a time, and unloads and positions them for securing to the pontons.

When a fleet of bridge trucks arrives at a bridge site from a camouflaged dispersal point, things happen quickly and with split-second precision. The first truck backs into position at water's edge, a big Seiberling ponton comes out of its heavy canvas covering and is unrolled to its full thirty-three-foot length. Valves are opened and a mobile air-compressor fills the bag. Bulkheaded air compartments keep these pontons afloat even under strafing attacks. When the ponton is floated, the carrier moves close to the water's edge, and the hydraulic crane unloads steel saddles which fit snugly over the ponton, giving it rigidity and protecting it from bullets or flying shrapnel. Now the crane unloads the perforated steel treadways which are fifteen feet long and have high guard rails along the outside of their two-foot width. Two pontons supporting a pair of treadways make a fifteen-foot bridge section.

When three sections—forty-five feet of bridge—have been joined, they are ferried across the stream with an assault boat and fastened on the opposite shore. An amphibious jeep and a bulldozer usually go along on the first trip so they can clear an old road or begin work on a new one.

The Commander's Signal Plan

COLONEL HENRY J. SCHROEDER, *Signal Corps*
Instructor, Command and General Staff School

THE 1st Infantry Division is preparing plans for enveloping the hostile south flank. The III Corps Field Order was received at 1300 today. The attack will be launched at 0500 tomorrow, 5 June. It is now 1500, 4 June. The 1st Infantry Division plans are being discussed at a staff conference at division headquarters at Vieil Hesdin (9910). The obtained by the presence of the Signal Officer at general staff conferences where tactical operations, intelligence, and supply plans are discussed or evolved. The Signal Officer then builds his signal plan at the same time the other staff officers prepare their plans for operations, intelligence, and supply. The principal signal requirements of the commander

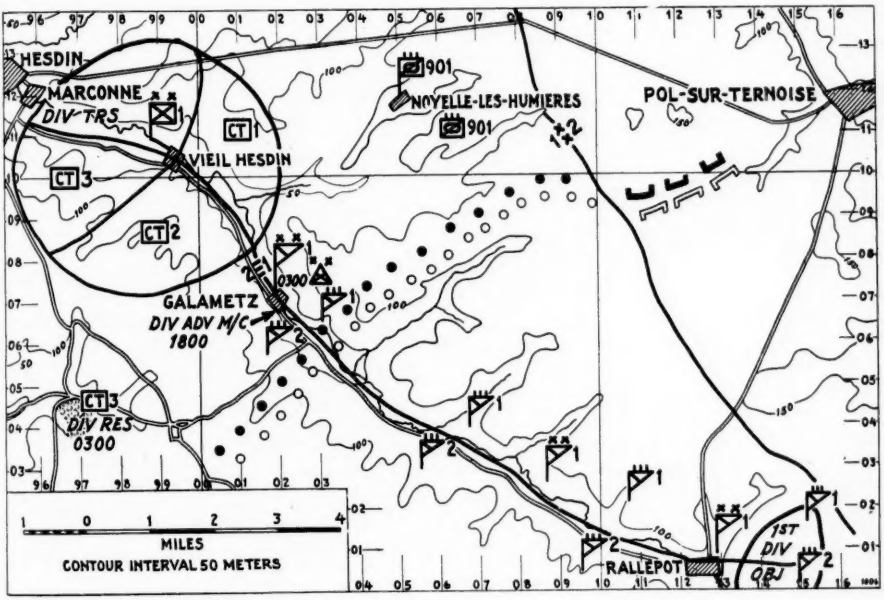

FIGURE 1.

Division Signal Officer is present and has marked his map as shown in Figure 1. The rear echelon has been tentatively placed at Marconne (9612).

As for any other military activity, signal communication for this envelopment needs careful and detailed planning to meet the tactical and logistical requirements. The preparation of an adequate signal plan necessitates a knowledge of the detailed tactical plan on the part of the Signal Officer, and at the earliest possible moment. This is best and his staff are outlined in Figure 2. Note that each staff section has specific signal needs.

A signal plan for an operation or a tactical situation usually includes the following five items:

1. Paragraph 5 of the field order, including the locations and probable movements of the division and combat team command posts.

2. The hour the signal system will be ready for operation.

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3. The essential signal channels and service to be provided.

4. The signal supply details affecting the plan.

5. The signal troops required by the plan.

These five items of the plan may be presented quite simply to G-3 or the commander and are later elaborated in detail by the Division Signal Officer. The framework for this elaborated signal plan follows a signal check list. Signal check lists vary with the type of operations. They are very complete for amphibious operations and relatively simple for meeting engagements.

Let us examine the five items of the signal plan in detail. The first item is paragraph 5 of the field order, including the locations and probable movements of the division and combat team command posts. The Division Signal Officer notes briefly for item 1, or paragraph 5 of the field order:

1. a. SOI, Index No. 11, 29 Apr
Radio silence to 0530, 5 June, except Cav.
b. CPs and Sig Axes: Map.
c. Div Adv Msg Cen: Map.

Item 2 of the signal plan is the decision as to the time, that is, the hour and date, by which the signal system must be ready for operation. This time of readiness for signal operation states the hour when the principal or essential channels are to be ready. There are usually specified other hours when reinforcing or less essential channels are to be completed. Thus the signal facilities will become more complete with time, or will be adjusted to meet the requirements of the changing tactical situation. The hour of readiness is predicted, and takes into consideration safety factors to permit last-minute changes.

The Division Signal Officer notes tentatively for item 2 of his plan:

2. Signal System ready for operation by 0200, 5 June. Telephone service to Adv Msg Cen at GALAMETZ (0207) and to 901st Cav at NOYELLE-LES-HUMIERES (0511) by 1800, 4 June.

The essential signal channels and service to be provided, such as messenger, telegraph, telephone, radio, and others, are listed under item 3 of the plan. Some of the channels and nets are covered by standing operating procedures, "SOP," or they are listed in the Signal Operations Instructions, commonly called "SOIs." The Division Signal Officer's plan lists only the additional channels and service, that is, the changes in SOP which are required for tomorrow's attack. He notes, therefore, for item 3:

3. a. See Sig Co SOP.
b. Radio to 901st Cav; other radios silent until 0530, 5 June.
c. Telephone service to Div Adv Msg Cen and to 901st Cav.
d. Wire, Rad and Msgr service to Div OP at (0307).

The Division Signal Company SOP prescribes the other service and channels which are routine.

Later, after the staff conference, the Division Signal Officer would order prepared a complete summary of signal service to be provided, including SOP items. His detailed plan, with supporting charts, would show eventually the signal channels between the signal centers at the various command posts, control points, and administrative establishments. The signal instruments to be connected at the terminals of these channels are usually self-evident but special nets may require that some terminal equipment, such as radio sets, be specified. These data are conveniently shown in chart form, with explanatory notes to indicate such details as the units responsible for the installation and operation of new channels, changes concerning existing channels, special radio nets, messenger routes and schedules, current serviceability status of signal channels, and similar details.

Item 4 of the signal plan deals with signal supply. The organic signal equipment of units is adequate only for limited tactical operations. Items such as wire and dry batteries are used up rapidly in combat. Tactical operations which require abnormally long distances between command posts may require

additional wire and telephone repeaters and more powerful radio sets. Amphibious operations usually require additional and special signal troops and equipment. In any event the signal supply requirements for the operation must be coordinated with the tactical plan, both as to time the equipment is to be available and the amounts required. The needs of all units, including their subordinate units, are consolidated in a few requisitions. The required signal material is made available in appropriate signal dumps.

For this operation the Division Signal Officer knows that the units of the division have their organic signal equipment and their allowance of signal supplies. Additional signal equipment, such as wire, telephones, radio sets, and dry batteries, will be needed tomorrow for the continued attack on the day following. He notes, therefore, for item 4 of his plan:

4. Signal requisitions from subordinate units to Div by 2000, 4 June; consolidated requisition to Army by 2359, 4 June. Daily thereafter. Include Cav and Rad Plat.

Item 5 of the signal plan deals with the signal troops required by the plan. Organic signal troops may not be enough. The signal service to be provided in accordance with the plan may require additional signal communication troops. Timely arrangements should be made for their assignment and assimilation. For this attack the Signal Officer notes briefly for item 5 of his plan:

SIGNAL REQUIREMENTS OF COMMANDER AND HIS STAFF

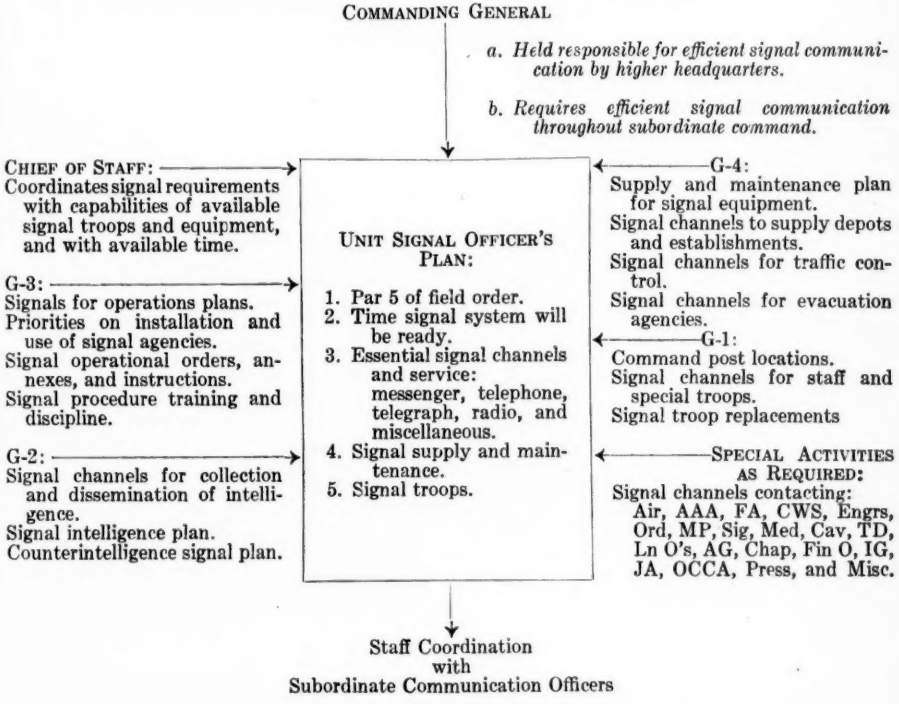
COMMANDING GENERAL
a. Held responsible for efficient signal communication by higher headquarters.
b. Requires efficient signal communication throughout subordinate command.
CHIEF OF STAFF:
Coordinates signal requirements with capabilities of available signal troops and equipment, and with available time.
G-3:
Signals for operations plans.
Priorities on installation and use of signal agencies.
Signal operational orders, annexes, and instructions.
Signal procedure training and discipline.
G-2:
Signal channels for collection and dissemination of intelligence.
Signal intelligence plan.
Counterintelligence signal plan.
UNIT SIGNAL OFFICER'S PLAN:
1. Par 5 of field order.
2. Time signal system will be ready.
3. Essential signal channels and service: messenger, telephone, telegraph, radio, and miscellaneous.
4. Signal supply and maintenance.
5. Signal troops.
G-4:
Supply and maintenance plan for signal equipment.
Signal channels to supply depots and establishments.
Signal channels for traffic control.
Signal channels for evacuation agencies.
G-1:
Command post locations.
Signal channels for staff and special troops.
Signal troop replacements
SPECIAL ACTIVITIES AS REQUIRED:
Signal channels contacting:
Air, AAA, FA, CWS, Engrs, Ord, MP, Sig, Med, Cav, TD, Ln O's, AG, Chap, Fin O, IG, JA, OCCA, Press, and Misc.
Staff Coordination with Subordinate Communication Officers

FIGURE 2.

5. Rad Plat from Army to 1st Div Sig Co, 1700, 4 June, at HESDIN (9512).

The signal troops serving a headquarters and furnishing the communication between command posts are composed of highly skilled teams, trained technically and practically to function under battle conditions. Communication between command posts is usually maintained on a twenty-four hour basis, day after day. This demand for continuous signal functioning, as well as for spare teams for manning extra command posts during displacements and for additional signal centers, requires that communication personnel be used for basic *signal* needs only. They should not be used for purely clerical or non-signal activities except in serious emergencies. Unless this precaution is enforced, signal troops as such will not be properly trained and available when needed.

Let us review briefly the orders and instructions which activate the signal plan. The principal item of the signal plan, from the commander's viewpoint, is usually said to be item 1 which is summarized in paragraph 5 of the field order. Sometimes this summary becomes long and detailed. It then may be placed in a separate "signal order," referred to in paragraph 5 of the field order, and attached as an annex. The signal order is quite complete and contains more of the items of the signal plan. Sometimes fragmentary orders and brief messages are issued to put the signal plan into operation without undue delay.

Signal operation instructions, or the "SOI," are issued for the tactical control and technical coordination of signal agencies throughout a command. They affect primarily the employment of signal communication agencies and troops. Commanders and their senior staff officers will have occasion to use personally some of the items of the "SOI." They should receive training in the application of such items of the SOI as the map coordinate code, radio call signs, and simple signal security procedures.

The signal SOP is usually issued by the Division Signal Company Commander, who is also the assistant Division Signal Officer. The SOP thus has the necessary coordination in the division staff sections and is a standing order for the Division Signal Company. The SOP would prescribe routine methods for the installation, operation, and maintenance of signal communication facilities by the Division Signal Company. Also, signal plans and orders for this particular tactical operation are based on the signal SOP, and need add only the specific information and special instructions which are peculiar to the coming attack, and which supplement or modify the signal SOP.

Signal SOP's usually contain specific details on items 3 and 4 of the signal plan discussed above. Under item 3, "essential signal channels and service to be provided," would be found instructions on such subjects as messenger schedules to various CP's, the number of telegraph and telephone channels to subordinate units, a priority list of staff officers requiring telephones at each echelon, special message center and radio procedures, and routine details concerning visual, sound, and pigeon communication. Under item 4, "Supply details affecting the plan," might be listed any changes in the procedures for establishing the division signal dump, for submitting signal requisitions, for delivery of signal supplies and equipment, and for signal maintenance activities.

In the SOP, signal teams for each echelon and for the advance CP are usually set up for march, bivouac, and combat situations. The principal items of transportation and signal equipment with each team are indicated, and specific duties are often given for the Signal Company officers and principal noncommissioned officers under various tactical situations.

Thus in this situation the signal plan to meet general staff requirements for the envelopment can be quite simply stated. It contains the essential elements, or the command decisions, relative to signal communication, and modifying—or elaborating on—the signal SOP. The technical details of this plan are worked out by the signal and communications staff officers and troops after the plan has been approved. The 1st Infantry Division

Signal Officer's plan as of 1500, 4 June, for the attack at 0500, 5 June, as he jotted it down during the general staff conference, is as follows:

Item 1 (paragraph 5 of the field order, including the locations and probable movements of the division and combat team command posts):

a. SOI, Index No. 11, 29 Apr
Radio silence to 0530, 5 June, except Cav.
b. CPs and Sig Axes: Map.
c. Div Adv Msg Cen: Map.

Item 2 (the hour the signal system will be ready for operation):

Ready by 0200, 5 June. Telephone service to Adv Msg Cen at GALAMETZ (0207) and to 901st Cav at NOYELLE-LES-HUMIERES (0511) by 1800, 4 June.

Item 3 (the essential signal channels and service to be provided):

a. See Sig Co SOP.
b. Radio to 901st Cav; other radios silent until 0530, 5 June.
c. Telephone service to Div Adv Msg Cen and to 901st Cav.
d. Wire, Rad and Msgr service to Div OP at (0307).

Item 4 (the signal supply details affecting the plan):

Signal requisitions from subordinate units to Div by 2000, 4 June; consolidated requisition to Army by 2359, 4 June. Daily thereafter. Include Cav and Rad Plat.

Item 5 (the signal troops required by the plan):

Rad Plat from Army to 1st Div Sig Co, 1700, 4 June, at HESDIN (9512).

This signal plan is non-technical. It can be quickly checked and approved by G-3; and the draft for paragraph 5 of the field order can be turned over to the typist for inclusion in the field order. That takes care of item 1 of the signal plan. The remaining four items of the plan are usually put into operation by brief messages to the units concerned, principally elements of the Division Signal Company. Signal supply details, item 4, are coordinated with G-4, and the necessary instructions are issued as part of the administrative order.

In addition to the above, while the signal plan was being drafted, the Division Signal Company had been alerted. It had started to install some of the more obvious and SOP axial wire lines. After the division staff conference and the approval of the signal plan by G-3, further details were worked out in the Division Signal Officer's section, with the help of the Division Signal Company commander, who is also the assistant Division Signal Officer. He sent out messages to his various platoons and teams as the details were worked out. The signal plan was thus put into operation with a minimum of delay.

Conception and Execution.

Tactical problems should always take into account the two aspects, conception and execution. Military history presents numerous cases which show that in war conceptions that were judicious, logical, and even possessed of the earmarks of genius failed, when put into practice, as the result of poor execution. On the other hand, an operation conceived in a defective form succeeded, not alone on account of the moral qualities of command and troops, but on account of a rational and logical adaptation of the means to the decision that had been made.

—General Leopoldo Mendez Lopez in *Memorial del Estado Mayor General*, Colombia.

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"Little Leavenworth"

MAJOR REGINALD L. HATT, *Cavalry*

ON the 13th day of March this year, an airplane of the Air Transport Command roared over "The Hump," bearing a small group of officers of the United States Army. These officers were destined to be pioneers in an unusual experiment.

The idea for this experiment had been germinating in the minds of several officers of the U. S. Army who held responsible places in our mission to China. Among these far-thinking officers was Colonel Norman McNeill, Infantry, then Executive Officer of the Infantry Training Center. A graduate of one of the two-year courses at the Command and General Staff School, Fort Leavenworth, Kansas, and a former member of the instructional staff of the Infantry School at Fort Benning, Colonel McNeill had been thoroughly indoctrinated with the value of training in staff operation and procedure.

During his service in China, Colonel McNeill had been impressed with the fact that some of the effectiveness of the Chinese Army officers graduated from the Infantry Training Center was being lost. He felt that this was due to the lack of understanding, on the part of the higher ranking officers of the Chinese Army, of the principles of modern warfare as employed by the United States Army. He also believed, with the newspaper *Sao Tang Pao*, that the middle and high-ranking officers of the Chinese Army were still lacking experience and study in the coordination of land, sea, and air forces and that of the different modern arms.

With Colonel McNeill, thinking of a possible solution to a problem results in some action being taken—without delay! He, therefore, immediately carried his new idea of organizing a school, patterned to a very great degree after our Command and General Staff School, which would correct some of the evident deficiencies, to his superior officer, Brigadier General T. F. Wessels. General Wessels, seeing the merit in such a plan, undertook to "sell" this idea to American and Chinese military leaders all the way up the line. General Dorn was contacted, as were General Stilwell and the authorities in Chungking. The seed was sown, and the growing season was good!

Meetings were held. Letters traveled back and forth by courier and by post. Phone lines were utilized. Plans were made and discarded. But, after many anxious months, full approval was secured! Chungking gave its full blessing and the "General Staff School" of the Chinese Expeditionary Force was an actuality! Immediately the preliminary work necessary for such an undertaking was initiated. The "spade work" began as the wheels of the big transport touched the field at the end of its journey. The instructors of this, the newest in military schools of the United States Army, were at the scene of their future labors, ready for hard, earnest, and difficult work.

There was a physical plant available, ready for operation with no further expense of construction. The grounds and buildings of the Infantry Training Center were only being partially used at the moment. Administrative personnel were already on hand, thoroughly trained in their duties.

The Infantry Training Center had been established by order of the Military Affairs Commission of China. It was designed to train officers and selected enlisted men of the Chinese Army in instructional methods, tactical principles, and the care and use of weapons and equipment. The methods of instruction were those used in the United States Army. However, they were carefully regulated to the needs of the Chinese Army. The Training Center had been initiated about 1 April 1943, with the first classes graduating on 13 May the same year.

Thus, a going concern was ready for use. There existed a mammoth reservoir of possible students. The instructors, all graduates of the Command and General Staff School and other Service Schools of the United States Army, were on hand. All that was necessary was to shape the course, prepare

the conference, lecture, and map problem material, and the job would be practically accomplished!

Traditionally in the Chinese Army, there is little delegation of command responsibility to staff officers. The commander carries the lion's share of the load, unaided, and without dependence upon the advice and the assistance of his staff personnel. The close "teamwork" we are accustomed to having within our various staffs is an almost unknown quantity in this hard-fighting Chinese Army. If close teamwork, assured by cooperation and collaboration within and between all sections, could be inculcated in the Chinese general and special staff groups, it was believed that their efficiency would be increased many, many times. And this enthusiasm was transmitted to the new members of the instructional staff.

Thorough analysis of the mission of the school was necessary to properly evaluate the difficulties and arrive at a sound, workable solution to those problems. This mission, as told to the first students, was to teach high-ranking Chinese staff officers the doctrines of the United States Army, and staff procedure as taught at Leavenworth, but applied to the Chinese Army organization. That would help carry out the mission of the United States military program which had been initiated to help the Chinese increase the combat efficiency of their armed forces. It had been designed, truly, to help China help herself!

There were many difficulties to beset the path, right from the start. The Chinese staff organization differed in many respects from the staffs of comparative United States units. The instructors had, of necessity, to study this Chinese organization in order to point their instructional material in the correct direction. Field manuals, texts, instructional aids, were all conspicuous by their absence. Information regarding the Tables of Organization or the Tables of Equipment of the Chinese Army was lacking. The state of training which could be expected among the new students was an unknown factor. Good maps were simply not available for use in map problems, nor were there any air photos. Even the absence of such things as overlay paper, office supplies, colored pencils, chart paper—things we were accustomed to have at hand in our instructional efforts in the States—represented difficulties of very great magnitude. It was necessary to start, colloquially speaking, "from scratch."

With the schedule at hand, the work started. Subjects were assigned each instructor, suggestions made as to how best to put the subject over to this different type of student, and the big task of preparing the conference material was begun.

A publication room was set up with an officer in charge. Teams of American enlisted men and Chinese interpreters worked together on the preparation of the necessary charts, diagrams, maps, and posters. Remember, all of these instructional aids had, perforce, to be captioned in Chinese! The difference in language certainly contributed to the difficulties in a great measure. Charts would be prepared, only to have errors in translation become evident upon careful analysis. A trial and error method had to be the initial effort along these lines.

Conference material was prepared, discarded, and prepared again. The instructional staff had to depend upon their memories for pertinent material. Advice was sought from every conceivable source, the most fruitful being visiting officers from various of the traveling instructional groups who had been with the Chinese Army in the field. Knowing the actual situation, these officers were able to give much valuable advice, which aided in an immeasurable manner the preparation of the subject matter. Advice was, of course, sought from officers of Headquarters of the Chinese Expeditionary Force. Their advice was a contributing factor in getting the correct picture of the Chinese organization and its needs in training. Chinese as well as United States officers were lenient with their time, and provided a reservoir of information for the use of the instructional staff.

After the material was prepared, the instructor and his interpreter got together and read the script over carefully. Some unexpected difficulties then showed up, which had

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to be solved. Many terms, phrases, and expressions used in the United States as a matter of course were found to be quite untranslatable into Kuo Yü, the Chinese national language. Scripts had to be changed and material discarded due to this difficulty. It was finally decided that, if the interpreter could not translate the exact meaning into Kuo Yü, the thought would be reworded, or it should be discarded.

The methods used throughout were a modification, made necessary by the bilingual nature of the school, of the methods used in schools in the United States. The instructor prepared the conference material or set up his map problem. He and his interpreter then checked the script as to whether or not it could be translated without losing the salient features of the paper. When all of these difficulties were solved, the material was presented to a committee composed of other instructors. These officers read it over for violations of tactical principles and nonconformity to the school doctrine. Corrections were then made by the preparing instructor. Then the paper had to satisfy the Final Review Board, composed of the Senior Instructor of the school, the Assistant Senior Instructor, and the Vice-Superintendent of the school (a Chinese Army officer).

While the material was being typed, the charts and other accompanying material were worked out and prepared by the instructor and the publications department. Mimeographed material such as outlines, tables, requirements, and solutions were translated into Chinese and then run off. Any maps necessary were procured, checked, and overlays made where necessary. Sketches were, in many instances, necessary in lieu of maps.

The completed typed conference material and the accompanying materials were returned to the instructor for final checking. The material was checked in meticulous detail, since many errors can creep in when two languages are involved. The interpreter aided his instructor in this checking process, and errors found were corrected at once. If correct, the accompanying material was sent to the chart room for storage until the time for presentation. The script was given to the interpreter, who studied it to gain understanding of the contents. After the interpreter had studied the material and was sure that every single word and thought was translatable and that he understood the thought expressed, the instructor and interpreter got together for a rehearsal. Timing was carefully checked, the two working together as a team.

In connection with timing, there is this to remember. Due to the necessity of translating the English of the instructor into the Chinese of the students, the instructional time is cut in half. Half of a lecture, for example, is devoted to the translation into the Chinese language. Questions and answers also have to go through this process. The student poses a question; the interpreter explains to the instructor just what the question is; the instructor must then formulate his answer to fit the situation; and then it must be translated back and announced to the student by the interpreter. A question-and-answer period is a bilingual gymnastic merry-go-round. Not only is it necessary to bridge the gap between the two languages, but it is also necessary to mesh the thoughts of two somewhat different peoples.

The instruction fell, generally, into the following classifications: Principles of and staff functioning in defensive operations, offensive operations, and in special operations were thoroughly discussed. A comparison of staff functions of the Chinese and American Armies was carefully made. The students were given a full explanation of the methods used within the United States Army staffs. Then it was demonstrated how the same methods applied to their own staffs would increase their combat efficiency. Characteristics of weapons were carefully explained and demonstrated in field firing. In this portion of the instruction, all weapons now in use in the Chinese Army, as well as the American weapons which may be furnished in the future, were demonstrated. In all the instruction, where applicable, the student learned "by doing," as he acted as a member of the general staff or the special staff

in the map problem, practical work, etc.

The final week of the course was devoted to a two-sided map maneuver, in which the students worked with two hypothetical armies, one reinforced and on the offensive and the other on the defensive. The students working as staff officers of the reinforced army were required to estimate the situation, plan, and issue orders for:

a. March to contact.
b. Bivouac en route.
c. Overcoming a delaying force.
d. Move to line of departure under cover of darkness.
e. Attack at dawn.
f. Pursuit.
g. Attack of a river line.

The students acting as staff officers with the defending army were required to estimate the situation, plan, and issue orders for:

a. March to contact.
b. Bivouac en route.
c. Sending out a delaying force.
d. Occupying a defensive position.
e. Withdrawal from action.
f. Retirement.
g. Defense of a river line.

Both armies had aviation of all types, in small quantities, available on call. Parachute, airborne, and mechanized threats were imposed against both sides throughout the problem.

This first course started on the 15th of May with an enrollment of seventy-two Chinese officers, many of them right out of the front line of Burma and Central China. Among the seventy-two were thirteen general officers and the remainder about equally divided between the grades of colonel and lieutenant colonel.

The course was designed to run eight weeks. However, due to the success experienced and the demands of the Chinese Government, preparations for succeeding courses to run for ten weeks duration are being made and the course is to be repeated until the need for such training is no longer present.

The students of this school had a long day. It started with the traditional "first call" at 0540 hours. The classes (six days per week) started promptly at 0700 hours and continued to 1100 hours. The time between 1100 hours and 1330 hours was set aside for naps, bathing, sick call, and the traditional "reception of guests." Afternoon classes convened at 1330 hours and were dismissed at 1730 hours. Study, review, and research time were the student's portion until "lights out" at 2130 hours. Those were busy days!

All in all, there has been similarity between this "Little Leavenworth" and the school on the banks of the Missouri River. The subjects covered were practically identical (with such revisions as necessary to make them applicable to the situation and mission). The instructors, being themselves graduates of the Command and General Staff School at Fort Leavenworth, followed the same general principles of instruction that their counterparts follow on the platform of Gruber Hall. The students have the same hurried, intense existence; the same concern over whether the "writ" is for pay or not for pay; and the same desire successfully to complete the course and "get it on their records."

The administrative duties in connection with the General Staff School are shared by officers of both the Chinese and United States Armies.

Marshal Wei Li-huang, Commander of the Chinese Expeditionary Force, is the director of the school, functioning directly under the Generalissimo. The Vice-Director, and also the Chinese Army Commandant, is Major General Chao Chia-Shiang.

Colonel McNeill is the United States Army Commandant and is also the Senior Instructor.

Colonel Elbert W. Martin, FA, is the Assistant Senior Instructor, and Executive Officer.

Under these four officers are the following officers of the United States Army:

Lieutenant Colonel Edward D. Sirois, FA.
Lieutenant Colonel Aladin J. Hart, Cav.
Lieutenant Colonel Stephen Nordlinger, MIS.
Lieutenant Colonel William M. Myers, Inf.
Major Richard L. Craigo, CAC (AA).

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Major Leslie E. Jones, CAC (AA).

Major Joseph A. Schor, Inf.

Major Reginald L. Hatt, Cav.

Major Thomas W. Shallington, Inf (Secretary).

Lieutenant Stanley J. Smith, Inf (Publications Supervisor).

The mission is being accomplished. That is becoming more and more evident. Many things show the progress that has been made. In the initial stages of the school, the row on row of faces seemed to have a oneness and their owners, cool, calculating, detached attitudes. No questions could be inveigled from them, nor could volunteers be secured to answer questions.

Inereasingly, though, the faces have lost their immobility. An eagerness has taken the place formerly occupied by apparent blank detachment. The avid searching out of appropriate methods has resulted in intelligent questions and answers by these students and an increasing adoption of the principles used in the conference system of instruction.

There has been a very warm friendliness and cooperative spirit developed between the instructors and their students. Nothing in this has destroyed the respectful relationship which, traditionally in China, exists between students and teacher. One student expressed the thought that each student would be forever indebted to these instructors for the many hours of patient teaching; and that they would, also, be forever indebted to the United States for making this possible.

The American Military Mission to China is carrying out the assigned mission. The instructors of this "Little Leavenworth" in China are aiding in its successful accomplishment. Chinese Army staffs will gain increasing efficiency, more and more students will successfully be indoctrinated with American principles, and mutual gain to the cause of Chinese-American solidarity will be an ever constant thing! "Little Leavenworth" is and will be an *institution* in China!

The German Escape from Sicily

From an article by Lieutenant General Sir R. Gordon-Finlayson in *The Army Quarterly* (Great Britain).

WE now know, of course, how the Germans organized their escape from Sicily. It no doubt took a little time, but the results were good. Some four hundred antiaircraft guns of every description, with presumably masses of ammunition for each gun, covered the air above the vital parts of the seven miles of beach affected. The control organization must have been very good, for these guns put up a barrage which our attacking aircraft could rarely penetrate except with high-level bombing. The Axis made full use of smoke, of the hours of darkness, and of coast defense guns, and got away their three divisions, many badly shaken Italian troops, and nearly all their heavy material, including tanks, fairly comfortably. This performance and many others in this war show us that in spite of land artillery, ships of all sizes, and a powerful air striking force, there is little that the man on the ground cannot do tactically, even in the tightest corners, if he has enterprise and determination. Science, the ground, and the elements are out to help him, but he must think and fight for himself. Such a performance as this barrage and escape has never been done before, and it seems possible to apply its principles to river crossings, especially in retreat.

Preventive Medicine in Winter and Mountain Warfare

MAJOR WHITMAN M. REYNOLDS, *Medical Corps*

During the past two years the author has served with the 87th Mountain Infantry Regiment, the 10th Medical Battalion, the Mountain Training Group, and the Mountain Training Center. He was a member of the Columbia Ice Field Expedition and has assisted with the training of two divisions for winter operations. In addition he has been instrumental in organizing several schools of medical mountaineering.—THE EDITOR.

NOWHERE, with the possible exception of the jungle, are military operations more difficult than in winter and mountain warfare. Variable weather conditions, incredibly difficult terrain, and a determined enemy will test the soldier to the utmost. Exceptional, indeed, is the individual who is capable of prolonged efficient effort in such an environment. These facts cannot be disputed.

In addition to the tactical problems involved in winter and mountain fighting there are others which deserve most serious consideration. These problems concern the health of the troops. Conditions of snow, cold, high altitude, and rough terrain demand the highest degree of physical and mental fitness, and those not meeting the standard will be inefficient in combat. Our Army's experience in Alaska has emphasized these facts and the Russians know them well.

Why is it, then, that the past is so often disregarded? Are our soldiers less capable than we think they are, or is too much expected of them?

The answer is that in spite of all that has happened few commanders truly appreciate the tremendous personal demands of winter and mountain combat. What then can be expected but a brave, wasteful expenditure of energy, matériel, and sometimes men? Brief experience with mountain and winter troops is insufficient to counterbalance the background of a military lifetime. As a result serious mistakes may still be made. Even on maneuvers units may reach the line of departure fatigued and overheated because standard march rates are followed. If such a situation obtained in actual combat they would be incapable of prolonged aggressive action.

Another serious problem concerns the feeding of troops. All commanders realize the importance of hot food for winter and mountain troops, but in general, messing leaves much to be desired. The heat energy in food is what keeps men active in the cold, and a missed meal may mean the difference between the success or failure of a mission. During winter operations men cannot go on eating cold food day after day, without losing much vital energy. This may be customary in the tropics, but it is not compatible with operations in the cold. A short winter maneuver fails to emphasize this fact, but it will be demonstrated in a long engagement.

In addition there are still alarming numbers of casualties due to cold. Occurrences such as these continue to be blamed on the weather, the terrain, the enemy, or on the unpremeditated failure of some soldier. Attempts to clarify these explanations often result in an epidemic of buck-passing, and the basic cause of the difficulty is rarely established. This is the philosophy of an escapist. It is the admission of a partial solution to avoid the unpleasant reality of truth. Problems such as these must not be artfully pushed aside. Instead, they must be solved. If the doctrines taught in basic winter and mountain training were adopted by all there would be little difficulty.

Men and officers must not become smug when they hear the cliché, "In the winter one must fight the enemy and the cold." It is true that the enemy must be overcome in physical combat, but the conquest of weather, terrain, and the environment has vaster implications. It involves the application of all the skills of wintercraft to tactics, and only when this is done can the enemy be successfully engaged.

Technical reports from maneuver areas

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and theaters of operations show that high casualty rates from cold, moisture, and exhaustion warrant major consideration in the planning of any mountain or winter operation. During the Gallipoli campaign in World War I the British sustained 86,000 casualties from cold. What a tremendous influence this temporary loss of over five divisions must have exerted on the action in that theater. In contrast was the experience of the Finnish Army on the Russian Front 1939-1940. Frostbite and freezing were rare. A battalion in action for three months with temperatures occasionally at 60° below zero had only one casualty due to cold.

When troops, previously conditioned in mild lowland terrain, are selected for winter or mountain training their commanders frequently assume a bold mien. Their troops are tough or they would not have been chosen to undergo such training and all are eager to prove it. But toughness is not enough. In spite of advice to the contrary they will attempt to operate in the cold before they have received adequate equipment or training. On one occasion a battalion made a late fall march and overnight bivouac. The temperature fell unexpectedly to twenty degrees below zero, and the following morning at sick call there were approximately seventy-five casualties due to cold. Once a man becomes susceptible to cold his debility may be permanent, and repeated frostbite may render him unfit for future service. Were these casualties due to the lack of toughness or were they due to the commander's failure to appreciate the danger of the situation?

During a recent maneuver, Blue forces planned a brilliant move to occupy a certain height. One battalion made a long, cold motor movement, immediately followed by a fast eight-mile cross-country march through deep, heavy snow. These men did not even have the benefit of skis or snowshoes. Nevertheless, hot and tired as they were, they occupied the objective. Every man was practically exhausted and immediately many got into their sleeping bags too tired to eat or drink. Later that night a company of Reds filtered through the listless guards and wiped out the entire battalion.

On another maneuver, after a similar march the chief of staff of a famous old division remarked that "the Boy Scouts of Michigan armed with slingshots could have whipped us tonight." There is no levity in this remark. In essence the division had defeated itself. Inevitably the tempo of winter and mountain operations must be slowed to a rate compatible with human physiology. When it is kept falsely stimulated it reveals a failure of command to comprehend the unusual personal demands required by these operations. Unless unlimited troop replacements are available, fighting strength may be decimated without firing a shot.

Medical interest in the solution of these problems centers around two focal points, the individual soldier and the commanding officer. The former must be taught the essentials of existence in the cold, while in addition, the latter must be made to realize what the proper application of these details means in terms of battle effectiveness. Regulations state that the function of the unit surgeon is not merely to minister to the sick and injured but to advise his commander how his troops can be kept in good physical and mental condition. In winter and mountain fighting this is his most important task.

To preserve his unit's fighting strength the soldier is taught certain skills. Among these are the proper wearing of clothing and equipment, the preparation of hot food, the sterilization of water, the drying of sleeping bags and socks, and many other things all of which will make him a better mountain and winter soldier. The officer, on the other hand, must do more than approve of this doctrine; he must believe in it. The standard of his proficiency will consist of a working knowledge of the basic principles of mountain and winter operations, so that he may assume his responsibility in maintaining the health and efficiency of the soldier as an individual and of his command as a unit.

There is no precise line of demarcation between the mountains and the valleys, and there is no exact moment when fall becomes

winter or winter, spring. In like manner, the physiological difference between ordinary soldiers and those trained for operations in snow and cold is not evident on the surface. However, the latter must be capable of infinitely greater effort. For example, a two-hundred-pound foot soldier may march all day on relatively level terrain and accomplish less than ten thousand foot-pounds of work. That same soldier in the mountains, climbing one thousand feet in one hour, will accomplish two hundred thousand foot-pounds. This represents a tremendous increase in the energy expended; energy that must be replaced. Even the flat-land winter soldier must use up much energy just to move on snowshoes.

In addition, there are several other factors worthy of consideration. The higher a mountain soldier climbs the less efficiently his body functions due to the lowered partial pressure of oxygen in the air.

There is also the very important phenomenon of sweating and loss of body salt. It is well known that the intake of extra salt is an important health factor in hot climates. When salt is ingested it becomes a potent, vital force by maintaining the water balance of the body and by preventing excessive sweating. In the mountains, however, where the atmosphere is dry, there seems to be less perspiration. This creates a false sense of security for the novice. Nevertheless, through sweating, he may lose from one to eight pounds in an afternoon. What actually happens is that perspiration continues as before, but the moisture almost immediately evaporates in the dry air. Thus the loss of so much salty fluid goes undetected. Another source of water vapor loss is in expired air. Under normal circumstances a man loses one-third of his daily water output through his lungs. Imagine how much more he must lose as he pants up a steep mountainside. The mountain dictum is drink up in the morning, eat salt tablets, and carry a full canteen. This is the unit surgeon's recommendation, but how often does the commander see that this doctrine is obeyed?

Assuming that a platoon has been out patrolling for forty-eight hours, their initial water supply will become exhausted and they will be forced to drink off the land. Perhaps an ample water supply is available, but in the winter running water is often hard to find. As a result they may be forced to melt snow or ice. Even if fuel is available and tactical fires are permitted it will take one man all night to melt enough water for breakfast coffee and to fill all the canteens. With fires forbidden, it will be necessary to use a blacked-out mountain stove. The water obtained in this manner will be far below the basic requirement. During mild winter weather, troops living on less than a quart of liquid a day, in addition to an unbalanced diet and insufficient rest, will have difficulty in making a fifteen mile march over easy terrain.

During mountain and winter operations, rate of marching is determined by the grade, the character of the terrain, the altitude, and the comfort of the men, and not by some arbitrary table in a field manual. Almost without fail the unit using the mountaineer's pace will get there first in the best condition. Balance, rhythm, and timing are not just attributes of ballet dancing; they are the essence of mountain and winter marches. Arbitrary logistical figures such as a mile an hour for foot soldiers in the mountains, or even one thousand vertical feet up or down in an hour, must be examined with care and qualified. At zero degrees, who would attempt to walk into a twenty-five mile an hour wind unless the situation was most urgent? Yet time and time again commanders have required troops to do similar things with the result that march casualties have rendered the achievement worthless. A new series of logistical concepts must be propounded for each new environment. Weather, the terrain, the physical condition of the troops, the resistance of the enemy will change from hour to hour. A field manual may dictate a rate of march, yet if these factors are disregarded what commander can predict the condition of his troops at the end of a day's march?

Special food for mountain and winter

troops is less important than just plain food in sufficient quantity, when and where it is wanted. If civilian laborers need from four to five thousand calories a day, the soldier who is facing snow and cold should have the same. With foreign mountain and winter armies, whenever practical it is the custom to feed the troops two hot meals a day. This is accomplished by placing the food in heated containers and bringing it as far forward as possible. Men on outposts are temporarily replaced so they may enjoy a hot meal. During periods of movement this may be impossible. Nevertheless, a strenuous effort is always made. In special circumstances meals are individually prepared. Men must not be allowed to go to sleep without food, preferably hot. The surgeon knows that when a man is exhausted, cold, and hungry his vitality is at a low ebb. It is the duty of the commanding officer to see that his troops have some nourishment before they retire. This is no new idea, but when the energy output has been great, hot food assumes exceptional importance.

Almost everyone who has worked strenuously in the mountains, or in the snow and cold, knows the importance of rest. In fact, the amount of rest required seems all out of proportion to the work accomplished. When battle conditions are superimposed on normal winter activity this need for rest is even more. Normal military operations frequently permit the soldier short cat-naps and other periods of relaxation throughout the day. In winter operations, however, the soldier cannot drop just anywhere or his clothes will become dampened from the melting snow. If he wishes to relax he must find a dry spot or prepare himself a bed. Under these circumstances many soldiers would rather stay awake. The need for rest, however, must not be denied too often or a vicious circle will be initiated. The soldier is tired but refuses to rest. He grows cold but on getting into his sleeping bag finds rest impossible. Should he become a casualty in such a physical state he would almost certainly die of shock unless assistance was rapidly forthcoming.

It is important that every soldier bed down warm; however, this may be tactically impossible. On the other hand, if the soldier is healthy, rested, and well fed a few cold nights will not harm him. Commanders should prepare their troops for the time when it will be militarily expedient for them to remain cold for hours. The well-trained winter soldier must be prepared to operate in any weather. He must not fear the cold or storm. On the contrary, he must use them against the enemy. If he is not weather-bound, a blizzard may be the signal for attack. Americans have this heritage. Fort Ticonderoga fell without a shot being fired during a winter storm, and Washington crossed an icy Delaware. These were exceptional operations in times when troops went into winter quarters. Even in World War I there was little important winter fighting. Now, however, winter operations may be expected anywhere, and the mountain soldier may expect snow and cold twelve months of the year.

Of all the weather conditions making trouble for mountain and winter soldiers, cold is the most serious. Cold may be uncomfortable and dangerous if mal-fitting and improper clothing is worn. Over a long period of time it can be demoralizing. Dry cold with high winds causes much suffering, but cold and dampness produce the most casualties. The most serious thing that can happen to a soldier is to become overheated on a cold day. If he perspires faster than his sweat evaporates his clothing will become damp and may freeze. Moisture, cold, and poor circulation are the essential factors in frostbite and freezing. All mountain and winter soldiers are taught how to prevent these conditions, but strange as it may seem this prophylaxis must be controlled. During World War I the Italians required a supervised daily foot inspection to cut down the incidence of frostbite and immersion foot. How many of our commanders require that a similar inspection be made?

It is good winter doctrine not to wear damp clothing, but what happens to the soldier who is slow changing his socks during a march halt? Rather than be reprimanded or

left behind he continues walking with damp feet and soon a foot is frostbitten. This can result in one less gun for the morrow, and one more soldier who has become susceptible to frostbite. An effort should be made to pass the word when long halts are expected so that men can air out sleeping bags and other equipment. If such procedures are routine the men will sleep warmer, their clothing will be fresher, and their general health better. In winter and mountain operations the physical condition of a soldier is frequently more important than his marksmanship, for if he reaches his objective too weak to fight he should never have been committed.

Before men enter actual winter and mountain combat, examinations should be conducted to test their winter knowledge. It is essential that they have more than a manual dexterity. They must understand the reasons for what they are doing. If they have this knowledge, there will be a prompter acceptance of the recommendations of the unit surgeon, and his task will be more simple. But in the last analysis, however, it is the commanding officer who must see that these recommendations are carried out. The degree to which this is accomplished is a potent measure of his leadership.

U. S. Robot of 1918

Digested at the Command and General Staff School from an article in the *New York Times* 9 July 1944.

THE United States Navy, in the spring of 1918, built and fired at Bellport, Long Island, five robot plane bombs with four times the range and with greater accuracy than the present German robot bombs. Like the German weapon now reaching London from the Pas de Calais, it was directed by a gyroscopic mechanism. Charles Kettering and his associates at General Motors were working on a radio control mechanism when the whole project was abandoned with the end of the war.

Photographs of the German launching platforms now used for the robot bombs closely resemble the launching platforms used at Bellport twenty-six years ago. The stubby-winged biplane of that time ran off a light-gauge track 250 feet long. A cable pulley, wound on a tapered drum, got it from a speed of fifteen miles an hour to flying speed of sixty miles an hour at the end of the track. Thereafter, in flight, power was derived from the famous old Curtiss OX-5 ninety-horsepower engine that powered the historic Jenny trainer of those days.

The biplane had a wing spread of sixteen feet in each plane and weighed 2,100 pounds, including its explosive load of 1,000 pounds of TNT, the most powerful explosive of that day. It rose after launching to an altitude of from 2,500 to 3,000 feet, where the gyroscope leveled it off and kept it on its course until its gasoline was exhausted and it went into a steep dive for its target. The gyroscopic mechanism is reported to have been capable of keeping the plane on its course with great accuracy, compensating for all but the most violently irregular shifts in wind. The range was determined also with much accuracy by the amount of gasoline put into the tank. By varying that amount of gasoline the bomb could be dropped within any area within 400 miles of the launching platform, apparently some four times the extreme range of the present German bomb. This would have brought Berlin and many other targets within easy range of the weapon.

The flying bombs proved particularly easy and cheap to build and there were plenty of the OX-5 engines to power them.

XUM

Reducing Paper Work with the War Department Shipping Document

LIEUTENANT COLONEL EUGENE B. BROWNELL, *Ordnance Department*
Instructor, Command and General Staff School

MUD, mosquitoes, and loneliness may weary the soldier at the front, but paper work is the culprit to the military and civilian soldiers of Army Service Forces.

No one will deny that reducing paper work and simplifying procedure on the home front is helping to win the war. Not only are errors minimized, delays avoided, and manpower conserved, but an important "lift" to civilian and military morale results from replacing many cumbersome, outmoded practices with a few streamlined systems.

Among the important improvements accomplished in this respect by Army Service Forces is the standardization and simplification of requisitioning, purchasing, receiving, issuing, shipping, accounting, and reimbursement procedures in the handling of supplies and equipment. A few forms now suffice where many formerly were required; the number of copies of these forms distributed is kept to a minimum.

There is a new standardized requisition form for ordering supplies and equipment from the depots, standardized purchase forms for all services, a revised government Bill of Lading to facilitate shipment by common carrier, and the War Department Shipping Document for expeditious handling of supply shipments.

This article will discuss the latter form, the War Department Shipping Document. This standardized document has been prescribed for use at all posts, camps, and stations of Army Service Forces. It will be used for shipment of all supplies under control of the Technical Services at all depots, arsenals, loading plants, holding and reconsignment points, and ports of embarkation.

The purpose of the War Department Shipping Document is fourfold:

1. To cover all of the information required by the consignor (shipper) in connection with a shipment of supplies or equipment, by combining in one form data formerly shown on several forms.

2. To provide adequate and accurate information on the content of a shipment to receiving and forwarding agencies of the Transportation Corps, which move the supplies, that is, such agencies as the holding and reconsignment points, consolidating stations (where less than carload lots are combined into carload shipments), and ports of embarkation or debarkation.

3. To provide necessary receiving information to the consignee (party receiving the shipment) both in advance of, and with, the shipment.

4. To provide unit price data, where required for reimbursement purposes.

In other words, all of these purposes are accomplished by one form, copies of which are used right through from shipper to user, replacing numerous and varied forms previously required. Replaced forms, the use of which is specifically prohibited, include:

- Tally-outs
- Packing Lists
- Shipping Tickets
- Dray Tickets
- Tally-ins
- Dock Tallies
- Hatch Lists
- Unit Price and Reimbursement Forms
- Other shipping and receiving forms

The substitution of this one standardized form for the numerous replaced forms was accomplished by:

(a) Combining in the body of the new form, the essential information which was repeated on the forms replaced.

(b) Placing the variable information needed for shipping, receiving, or reimbursement purposes in the column at the right of the form.

(c) Having the shipping document, with sufficient copies for all purposes, accompany the shipment.

The advantages gained by use of the one form are obvious. Not only is time and man-

power saved by eliminating the duplication of data in all of the various forms formerly used, most of which were filled out by hand, but accuracy is greatly increased, as the recopying from one form to another is eliminated. Moreover, a shipment now can always be identified, as the shipping document accompanies the shipment. Previously it was not uncommon for a consignee to accept a shipment blindly and await arrival of papers to identify it at a later date. Another advantage is that the document always looks the same. Employees no longer have to become familiar with numerous, varied forms different in size and content.

The War Department Shipping Document comes in four variations, all reproduced in whatever numbers are required from the one Master Copy. These variations are:

Order Copy—canary or goldenrod in color

Property Copy—white

Oversea Copy—pink

Price Copy—white

These four variations are all exactly alike in content, except for the stub column, that is, the right hand column (see Figure 1).

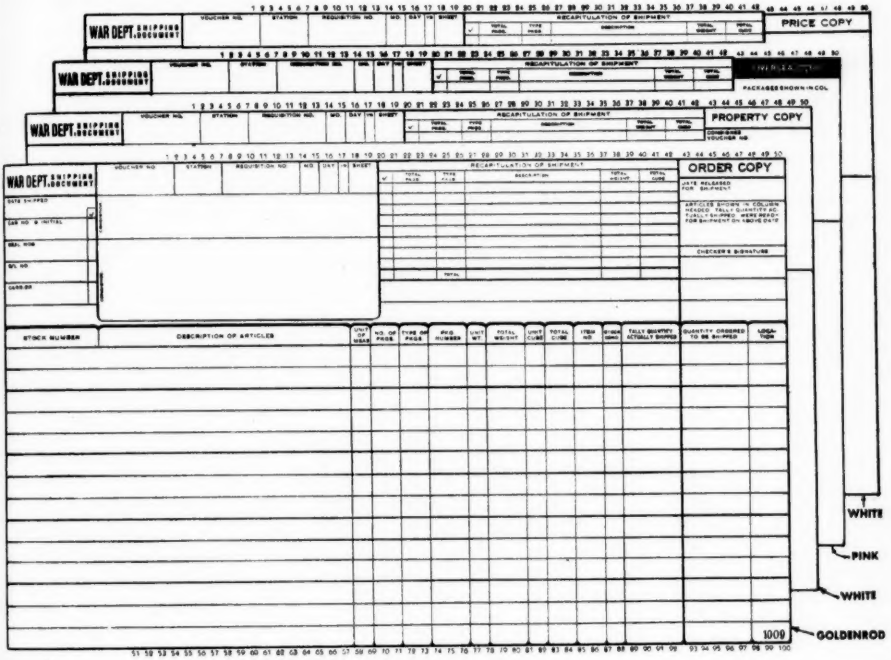


FIGURE 1.
THE WAR DEPARTMENT SHIPPING DOCUMENT.
THE ORIGINAL IS APPROXIMATELY 12½ × 8 INCHES.

Order Copies are used internally by the consignor (shipper). A sufficient number of Order Copies are prepared for each shipment for use as work sheets in the selection and preparation of supplies for shipment and as a basis for preparing the Bill of Lading and the final shipping documents; also to post stock records when electric accounting machines are not used.

Property Copies are used as final shipping

documents for domestic shipments. They accompany the shipment, fulfilling the requirements of the transportation agencies that handle the shipment, and on receipt by the consignee are used to tally-in (check in) the shipment and as a basis for stock accounting.

Oversea Copies are used as final shipping documents for overseas shipments, including Lend-Lease. They accompany the shipment, fulfil requirements of intransit agencies for information concerning the shipment, provide a basis for the ship's manifest, and are used by the oversea port of debarkation to receive, store, and forward matériel.

Price Copies are used when reimbursement or pricing in terms of unit cost is involved. This includes sales to other government departments, shipments to American Red Cross and Russian War Relief, certain Lend-Lease shipments, etc.

The steps involved in the preparation and use of a War Department Shipping Document may be illustrated by the procedure followed at a typical Quartermaster Depot in filling a requisition.

The requisition, generally received by teletype for an overseas shipment or by mail for a domestic shipment, is registered (recorded and time stamped) and edited by the Stock Control Division of the depot. Editing consists of determining whether the requisitioned supplies are available at the depot and, if available, the location of the stock. Also, the quantities of the various items ordered should be in case lots, and any odd-quantity lots will normally be adjusted to the nearest full-case quantity. This eliminates breaking a case and repacking the odd lot.

The next step is planning the shipment. Careful planning by the consignor accomplishes two basic objectives. First, items contained in the requisition will be correctly apportioned to the proper transportation units (carload, less than carload, truckload, less than truckload, air express, express, parcel post, and mail). Secondly, final copies of the shipping document will be prepared prior to the sealing of the freight cars or the departure of the trucks to which they pertain.

Determining the proper transportation unit or units to be used requires an experienced traffic man, or freight charges will be excessive. Factors considered include type of supplies, urgency, destination, weight and cubage of shipment, available service, hazards, rates, and freight classifications. Wherever practicable, shipments to the same or nearby destinations will be consolidated.

From the requisition as now edited and divided into transportation units, the Master Copy of the War Department Shipping Document is prepared. In a large depot where electric accounting machines* are used, the pertinent data for a single transportation unit is picked up from the requisition on tabulating cards and then transferred by machine to the Master Copy of the shipping document. This Master Copy is on specially processed paper which can be used for duplicating as many copies as are needed.

At this stage the Master Copy is only partially filled out; it contains the following basic data: voucher number; station number of the consignee or, if an overseas shipment, of the appropriate port of embarkation or technical service; requisition number; date; sheet number; consignor's name, address, and depot identification number; consignee's name and address; description of articles included in the shipment and their stock numbers; quantities ordered to be shipped; and certain other information. Further shipping data and the transportation data have yet to be entered.

From the Master Copy of the shipping document are now run a number of Order Copies (canary or goldenrod color) for internal use by the depot in completing and shipping the order. The Master is then set aside in the pending file for later use.

The Order Copies are sent to the warehouse where the supplies to fill the shipment are picked from stock, checked, assembled, and tallied into the transportation unit. The

*Where electric accounting machines are not available, the Master Copy may be prepared by billing machine, typewriter, or manually.

remaining shipping data—such as the number and type of packages, weight, cubage (on overseas shipments only), and quantity actually shipped—are filled in by pencil on the Order Copies, using carbon paper. If broken lot items must be packed, the required number of Order Copies are inserted as a packing list. Then the Recapitulation of Shipment box is filled in and the Order Copies dated and signed by the checker. This signature confirms that the shipment is properly assembled, packed, marked, tallied, and ready for shipment.

Two of these Order Copies are returned to the Transportation Division where the transportation unit selected is rechecked and transportation data added. Such data include date shipped, car and seal numbers (if carload shipment), Bill of Lading number, initial carrier, and the transportation release number (TS Route Number or ODT Unit Permit Number). These Order Copies are now complete.

One of the two completed Order Copies is used to prepare the Bill of Lading. Simultaneously, to save time, the other is used to enter the remaining shipping and transportation data on the Master Copy of the shipping document, which is drawn from the pending file.

The Master Copy of the shipping document is now complete, the Bill of Lading is ready, and the supplies are at the shipping dock awaiting shipment. Accordingly, a sufficient number of the final shipping documents to meet the prescribed distribution are run off from the Master Copy, which is then destroyed. If a domestic shipment, these final documents will be the white Property Copies of the document; if an overseas shipment, they will be the pink Oversea Copies. The Price Copies will only be used when unit price data are required; then, if a domestic shipment, they will be substituted for the Property Copies. On overseas shipments, the Price Copies will normally be used in addition to the Oversea Copies.

Copies of the final shipping document will be forwarded in advance of the shipment to enable the consignee to plan the disposition

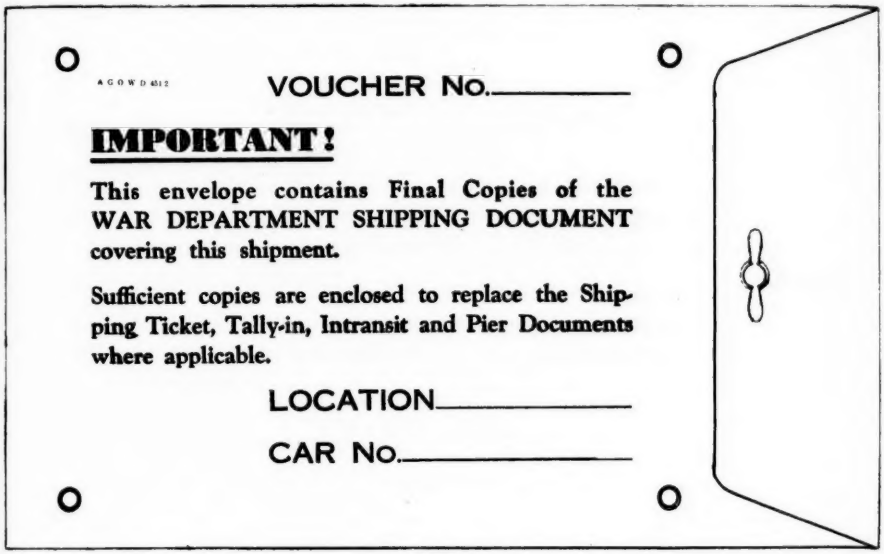

A G O W D 4512
VOUCHER No.
IMPORTANT!
This envelope contains Final Copies of the WAR DEPARTMENT SHIPPING DOCUMENT covering this shipment.
Sufficient copies are enclosed to replace the Shipping Ticket, Tally-in, Intransit and Pier Documents where applicable.
LOCATION
CAR No.

FIGURE 2.
KRAFT PAPER ENVELOPE WHICH CARRIES FINAL SHIPPING DOCUMENTS.

of the supplies. On domestic shipments, one copy is mailed in advance to the supply agency of the consignee. On overseas shipments, the advance copies will be mailed to the Port Transportation Officer of the appropriate port of embarkation.

Of the remaining copies of the final document, the prescribed number to accompany the shipment are placed in a strong kraft envelope, marked as in Figure 2. This envelope is fastened securely to the shipment and the final shipping documents identify the shipment through to ultimate destination.

To complete the picture, the use of the War Department Shipping Document by the consignee should be noted. For the purpose of simplicity it will be assumed that the shipment is to a domestic consignee. The procedure on an overseas shipment is somewhat more involved because it goes through both a port of embarkation and a port of debarkation and the supplies must be physically handled in each.

First, the domestic consignee will receive an advance copy of the shipping document through the mail. This will be used for "due-in" information and advance planning for the disposition of the supplies.

When the shipment itself arrives, the documents that accompanied the shipment will be detached. The transportation data will be verified by the Transportation Office, and the packages in the shipment tallied-in. The shipping document is then signed and dated by the *package* inchecker, any discrepancies being noted.

The shipment then goes to the supply agency of the consignee where a consignee voucher number is assigned to the shipment and entered on the document in the stub column and the voucher date inserted. Then the inchecker for *articles* will tally-in all articles in the shipment, completing the column "Quantity Received" for each item. This quantity should check with the consignor's count in the column "Tally Quantity Actually Shipped"; if not, exceptions will be noted and the inchecker's count verified by another person. The inchecker (and the person verifying the count, if such is necessary) will then sign and date the shipping document. No acknowledgment of the receipt of the shipment is made.

The War Department Shipping Document procedure has been in use for more than twelve months, during which period continued refinements have been effected. The economies in matériel handling, manpower, time, and clerical effort resulting from its use have been substantial.

The battle for efficiency on the home front may be less spectacular than some of the victories in foreign fields, but steady progress is being made.

Precision Bombing

From *The Aeroplane* (Great Britain).

THE bombing of a particular house in The Hague by six de Havilland Mosquito bombers is a significant example of precision bombing at high speed. One house in the middle of the town had to be destroyed. The Mosquitoes found their target with no waste of time and bombed from fifty feet. The house and all within were left a mass of rubble. Whether the house contained Gestapo records or was housing at the time of the raid some particular important person or persons is beside the point. The real lesson of the raid is the devastation that can be caused by fast-flying aircraft carrying one large bomb, and the accuracy that can be obtained by the right aircraft and a well-trained crew. To send a large bomb through the front door of even a fair-sized building is a remarkable feat.

MILITARY NOTES AROUND THE WORLD

GERMANY

German Pickaback Plane:

An unusual German "bi-plane" was seen by the crew of a Mosquito on patrol over France. On closer observation, the "bi-plane" turned out to be a small aircraft attached to the top of a larger twin-engine type. At the same time that the pickaback plane was noticed, an Allied convoy was seen in the Channel nearby.

The Mosquito crew members reported that they could see between the two aircraft which appeared to be connected at the trailing edges of the main plane. The pickaback plane was flying at an estimated speed of between 200 and 250 miles per hour when the smaller ship suddenly lifted from its larger component, banked steeply, and flew away at right angles. The larger plane turned over on its back and dived straight into the sea without displaying any tendency to spin or glide. It hit the water about three miles east of the convoy and caused a terrific explosion.

No evasive action had been taken by the composite aircraft previously, and it was proceeding on a straight course for the convoy when sighted. The controlling pilot apparently saw the Mosquito and jettisoned the larger craft. It was not possible to determine whether the propellers of the expendable plane were working.

It is believed that the composite plane flies on three engines under the complete direction of the pilot of the top plane. Reports indicate that usually the top plane is an Me-109 and the lower ship a Ju-88. In making an attack, the Messerschmitt pilot releases his aircraft from the Junkers and the lower plane continues at a shallow angle of descent under the control of an automatic pilot.

A new nose section which has replaced the regular nose of the Junkers contains an explosive charge in the manner of the flying bomb. No doubt the pickaback planes will prove highly vulnerable to fighter interception due to reduced speed and will be comparatively easy antiaircraft targets.

(*Air Force*)

Protection for Railroad Engineers:

Constant strafing of German trains by Allied fliers has compelled the Germans to design special bullet-proof cases for the protection of the engineers. According to *Hamburger Illustrierte*, all locomotives traveling in dangerous zones are provided with these

devices. The Germans believe that the most important man on the train, the engineer, should be protected. "Passenger service," the paper states, "has to be maintained regardless of the rigor with which the enemy pursues his hostilities."

(From *Hamburger Illustrierte*)

"Panzerfaust" and "Panzerschreck":

The *Berliner Illustrierte Zeitung* has this to say about the two weapons pictured below:

"The *Panzerfaust* [tank fist] hurls its projectile, whose flight is controlled by a

PANZERFAUST.

stabilizer, against the target by the rocket principle. With the simple and dependable sighting arrangement even an inexperienced soldier can hit the enemy tank without difficulty. The *Panzerfaust* is so light and easily carried that the grenadier is able to carry it with him as easily as hand grenades. When it is fired, nothing remains in the hands of the grenadier but an empty tube.

"The big brother of the *Panzerfaust* is the *Panzerschreck* [tank terror]. In the language of the front, this effective close-combat weapon for use against tanks is called the "stove pipe." The *Panzerschreck* also operates on the rocket principle, but possesses a great-

PANZERSCHRECK.

er range. The protective shield keeps off flying particles of the propelling charge. The weapon is reloaded after each shot and requires a crew of two men. In its handling and construction it is simple and not easily deranged."

(*Berliner Illustrierte Zeitung*)

German Rocket Fighter Planes:

The German rocket-propelled fighter plane now in use as an interceptor against American bombers over the Reich moves so fast that even the men who have engaged it victoriously in close combat can give only sketchy descriptions of it. Officially known as the Messerschmitt-163 and called by American fliers the "flying wing" and the "jetty," the German craft is reported to have swished past

heavy bombers so fast the crewmen did not realize what they were, but fighter pilots said they were able to identify the enemy at twelve miles away by the spectacular dense white smoke or condensation trail stretching out a half mile behind each craft.

The stubby fuselage, only two-thirds as long as the broad, tapering wings, has room for one man under a transparent canopy. The short tail is thicker than that of the American P-47 and the wings have a swept-back appearance. There is a tail fin but no tail plane. The Me-163 is dark and dull-looking, apparently not waxed for greater speed, and from the puffy trails emitted when it is given short bursts of speed, the fliers conclude that it operates as a glider when power is not needed.

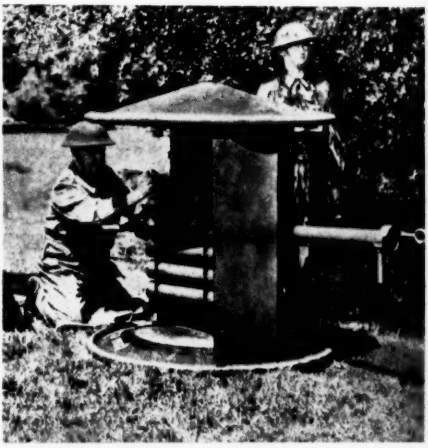
(From news reports)

GREAT BRITAIN

The Smith Gun:

The Smith gun was one of the weapons invented for use by the Home Guard to repel

a German invasion of Britain. Its design is unusual and even revolutionary in that the wheels form a stand and top-cover when the gun is up-ended for action. It is of smooth bore and fires shells of three-inch caliber. There are two wheels, one concave and the other convex. The gun fires two types of shell —antipersonnel weighing eight pounds and antitank weighing six pounds. It can be towed by a private car and even by a horse.



The great advantage of the Smith is that it is ready for instant action. When unlimbered, it is pushed over onto the concave wheel and is immediately ready for firing. The gun carries its own ammunition in special housings.

(*The Sphere*, Great Britain)

Parachute Surgeons:

The Royal Army Medical Corps has parachute surgical teams that have already been in action with great success. The *Lancet* describes one unit that established itself in a farm building, which had been seized by paratroops. It ran the building as a hospital for two days, while a battle raged around it. During that period the unit performed thirty-five operations. Thirty-one of the patients later reached base hospitals in good condition. Each team consists of six men, all of whom have been trained to be able to do everyone else's job in the event of casualties among the team during landing. Equipment is designed especially for lightness, compactness, and portability, so that the unit can move swiftly through rough country, possibly under

fire. The unit carries a light operating table with tressels, all presumably collapsible. They also drop with anaesthetics, plaster, dressings, fuel, plasma, and primus stoves. Paraffin pressure lamps and electric headlamps supply the surgeons with light for their work.

(From a British source)

Waterproofing Tanks for the Invasion:

The "waterproofing" of the vehicles for the great Allied Expeditionary Force so that they might reach the shores of France with all their engines working was described at Supreme Headquarters shortly after the landing in Normandy. The whole of the capacity of the steel sheet-rolling industries of Britain was taken over for this, one of the greatest rush jobs of the war; 280 factories were engaged night and day on it.

Much thought and experiment had gone into the work of waterproofing and designing equipment so that in various depths of water the vehicles could go ashore under their own power in fighting condition. The depth of water through which the tanks could and did go was six feet, plus wave allowance. Every rivet and every joint had to be sealed. Tanks had to be put into the water with their driver and engine compartments flooded and means had to be provided to get air to the engine and crew, to cool the engine, and take the exhaust.

(*The Times*, London)

INDIA

Indian Troops with the Maquis:

Reports from Switzerland reaching General Headquarters, New Delhi, show that Indian troops who escaped from the prisoner of war camp at Epinal are fighting with the Maquis, French patriot forces of the Interior. In many centers where the Maquis began a campaign of wrecking, shooting, and generally causing confusion among the Germans, Indians worked alongside of them and acted as snipers and guerrillas.

The German camp for Indian soldiers was situated near Epinal, capital of the Department of Vosges, close to both the Swiss and the German borders, with small steel works (probably now grown much bigger since the Germans began to move their Ruhr industries) and also cotton mills. To destroy some industries and a railway junction, the town was bombed by the Allies and the camp wherein the Indians were confined was hit. The men took the opportunity to make off to the countryside, hoodwinked their pursuers and the Gestapo, and went into hiding.

Some marched by night and eventually crossed into Switzerland and others helped by French civilians found their way to the headquarters of the Maquis who welcomed these unexpected additions to their ranks. The men included many Gurkhas taken prisoner in North Africa during the Eighth Army's retreat to El Alamein. To the Maquis they have been valuable allies. One report stated that Indian snipers were giving the Germans "considerable trouble." To get to the border, these men had to travel forty to fifty miles in difficult, hilly, and well-guarded country.

(Government of India Information Services)

U. S. S. R.

Animal Blood:

Animal blood is being used with great success in many Soviet hospitals. Injections of 100 to 200 centimeters at a time have a positive effect on badly wounded men, accelerating healing, raising vitality, improving appetite and sleep, and curing avitaminosis. The hospitals have special herds of "donor" cows, fed chiefly on lucerne [alfalfa], which contains a high percentage of Vitamin A. In one hospital 1,000 liters of blood were obtained from cattle during the past year, each "donor" supplying three to four liters twice monthly. Experiments have shown that animals can safely give over twenty liters of blood per month.

(*Information Bulletin*, Washington Embassy of the USSR)

JAPAN

Replacement of Ship Losses:

Subsidies have been granted to shipbuilders in Malaya and the Netherlands East Indies in order to speed production of merchant ships, according to a recent broadcast from Singapore. The report revealed the frantic efforts of the Japanese to replace their shipping losses caused by Allied submarines. "The matter of turning out more ships is regarded as the most important of all construction projects, followed by the question of food production," the announcer said. "Next comes the development of materials which are sent to Japan, and mining. From thirty to forty percent of the total subsidy in each district has been appropriated for the construction of wooden vessels."

(*Netherlands News*, Netherlands Information Bureau, New York)

The Betty:

In an effort to match our medium bombers, the Japs manufactured the Betty. Compared with our B-25 and B-26, the Betty has an extra thousand miles of range and at least equal speed.

But there is the usual catch. To get this range and speed, the Japs sacrificed armor and armament, just as they did with their Zero. By the extensive use of magnesium, they have in the Betty an unusually lightweight airplane. Magnesium, however, is a highly inflammable metal which is apt to burst into flames as soon as it is hit.

An examination of several wrecked planes shows that a little armor plate has been provided to protect the tail gunner, and heavy rubber mats have been added on the fuel tanks. But these measures were temporary, obviously taken in the field and not made a part of the standard equipment.

Betty's usual armament includes one 20-mm tail cannon, one 7.7-mm nose gun, another in the dorsal turret, and one 7.7-mm gun on each side. In newer types, the side blisters have been removed, leaving open ports. This gives the side gunner an increased arc of fire. It is possible that the dorsal turret now carries a 20-mm cannon.

Betty's armament is not completely inadequate. Even the earliest models had nose and tail turrets which could be rotated 360 degrees by hand. This permits the gunners to cover any attack angle, both front and rear. In this regard, Betty's armament was slightly ahead, but the Japs could not—or would not—keep in step with our improvements and they soon were left far behind.

Generally, the design and craftsmanship of the Betty is excellent. An interesting characteristic is that Betty's bomb bay doors are removed at the field before the take-off.

(*Air Force*)

UNITED STATES

Army Tankdozer:

The Army's new tankdozer is a breakthrough weapon developed cooperatively by the Corps of Engineers and the Ordnance Department, Army Service Forces. Consisting of a huge bulldozer blade mounted on an M-4 Sherman tank, the tankdozer combines some of the best features of both machines—the terrific work power of the bulldozer plus the striking power and protection of the tank.

The tankdozers swiftly slash passages through earth walls and hedgerows, and across sunken roadways which bar and channel the advance. Trees up to eighteen inches in thickness are snapped or pushed over by the powerful blades, while the tanks shed the

spattering of small-arms and light mortar fire. Few obstacles can stand in the way of the three and one-half ton blade, backed by the driving force of the medium tank.

It is intended that the tankdozer will be used in place of ordinary tractordozers only in cases where armored protection and fire power are needed.

(*Army and Navy Register.*
U. S. Signal Corps photo)

The Black Widow:

The P-61 Black Widow is the largest fighter plane ever built in this country. A twin-

tail, twin-engine fighter that looks like an overgrown P-38, the P-61 came into being as a result of action in the early days of the war when London was the bombing target and not Berlin. The Luftwaffe's raids under the protective cover of darkness had brought home the great need for a fast night fighter plane with plenty of fire power to be employed as defense against night bombings.

The P-61 is the first functional night fighter to come out of this war. Planes previously used for such tactical missions have been modified versions of aircraft originally planned for other types of operation.

Classified as a fighter aircraft, the P-61 is larger and weighs more than either the A-20 or the P-70, night fighter version of the Boston.

Inside the P-61's low-slung engine nacelles, that taper off with streamline effect into the thin tail-booms supporting the elevator and rudder surfaces, are two powerful Pratt & Whitney engines. Developing high horsepower at take-off, the engines, turning four-bladed Hamilton Standard propellers, pull the ship into the air in a comparatively short take-off run and give it good climb and maneuverability.

Because night landings on war-time fields are hazardous for fighters, new flaps and ailerons have been incorporated into the P-61.

In profile, the P-61's fuselage looks like a bloated jellyfish. It is very narrow and, although the nose section sticks out in front several feet ahead of the propeller hubs, the fuselage tapers down and quits almost with the trailing section of the big wing. Its speed, of course, is still secret, but it can hold its own with some of our fastest medium-altitude fighters.

(*Air Force.* Photo from *U. S. Army-Navy Journal of Recognition*)

Folding Bazooka:

The old-style, one-piece, five-foot bazooka was often found inconvenient when carried through dense undergrowth, or in planes and gliders, or when used by paratroopers dropping behind enemy lines. The new "folding bazooka," officially known as the M-9A1, 2.36-inch Rocket Launcher, eliminates these difficulties because it is carried as a two-piece unit and can be quickly and simply assembled in a few seconds to form a sixty-one-inch launcher for firing.

(*New York Times*)

New Type Rescue Boat:

A new type rescue boat, sturdy enough to be dropped from a plane by parachute from high altitudes, has been developed and several hundred are being rushed to completion. It is said that these boats can be dropped fully equipped to ship or plane survivors or castaways. They carry blankets, medical supplies, blood plasma, smoke signals, and rockets to discharge buoy lines.

(*Army and Navy Register*)

FOREIGN MILITARY DIGESTS

The Battle for Cotentin

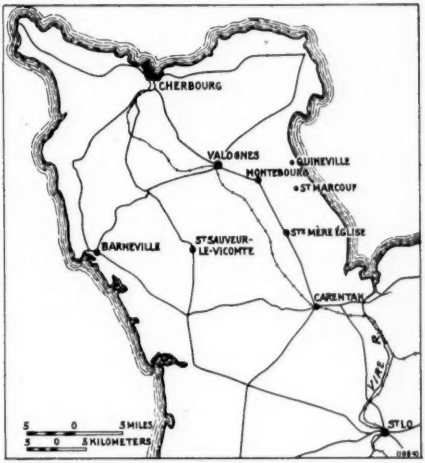
Translated at the Command and General Staff School from a German article by Dr. Wilhelm Ritter von Schram in *Pariser Zeitung* 6 July 1944.

An American account of the airborne phase of the invasion of the Cotentin Peninsula appears on page 21 under the title, "Airborne Invasion—Normandy." —THE EDITOR.

THE battle for the Cotentin Peninsula began shortly after midnight on 6 June 1944, and did not end till the beginning of July. It was among the hardest fought battles of this war and was remarkable from the standpoint of the heroic defense of the German troops in the face of an enemy landing with great superiority of forces. This enemy, Bradley's First American Army, has finally reached its objective, but it was able to attain it only after considerable delay and at the cost of bloody losses, which have disorganized to a very large extent the program of the invasion.

What has happened since 6 June on the Cherbourg Peninsula? At the end of a hard struggle lasting almost four weeks, the Americans have, to be sure, seized possession of the ruins of the city and port of Cherbourg, but the German command gained time to destroy this port in such a way as to prevent its immediate use by the Allies. More than all else, however, as a result of the effective German defense, it was possible to tie up powerful American forces in the northern part of the Cotentin Peninsula and, in consequence of this, to form a new front at the foot of the peninsula and also north of Saint Lo and south of Barneville, which now forces the enemy to engage in costly frontal attacks.

The enemy, in his invasion of 6 June, avoided attacking the northern coast of the



THE COTENTIN PENINSULA, SHOWING PLACES MENTIONED IN TEXT.

Cherbourg Peninsula, and particularly the fortifications of the port itself. He had undoubtedly studied German methods of attack as well as spied out our installations with the utmost accuracy. On this he had based the plans for his operations. Consequently, he decided on a flank attack on the peninsula from the east side. The point of main effort in the landings from the sea and air was in the level and especially marshy

dune region between the mouth of the Vire and Quineville. The necessary flat-bottomed landing boats for accomplishing this stood ready in enormous numbers. Landwards, however, the dry areas of the marshes, which had resulted from the unusually hot May weather of this year, favored the attackers.

As is well known, the English and Americans chose a combined attack method for their invasion. After heavy preliminary bombing of the German batteries and strongpoints, they carried out their landings, first at night from the air behind the German coastal positions, and then in the morning, supported by heavy naval artillery, from the sea. That is, the frontal attack was preceded by the so-called vertical envelopment from the air. Thus, on the cloudy but moonlight night of 6 June, two powerful American divisions, especially selected and trained, dropped by parachute and landed with troop-carrying gliders and established themselves in the northwest portion of the peninsula about ten kilometers back of the coast. [This was not the main landing area, although German sources reported landings in force here. —Editor.] They had landed in such a way that the powerful naval guns could still provide them with fire protection and screen them with a barrage. The country, which is thickly covered with hedgerows, favored the assembly of the paratroops and glider forces, but many Americans were killed by our defense fire as they floated down, or were taken prisoner after landing.

The first days of fighting in the Cotentin Peninsula were characterized by decided successes in the attacks of our tactical reserves. Called out in the night, they advanced concentrically from the west and north against the airborne enemy and were soon able to crowd him together to such a degree that he was robbed of all freedom of movement. Of the three points of main effort in his landings, on both sides of Valognes, north of Montebourg, and at Sainte Mère Eglise, only the latter were successful, while considerable portions of the northern groups were either broken up or wiped out. [The reported northern landings were diversionary, and consisted mainly of dummy parachutists.—Editor.] Sainte Mère Eglise, was at first recovered from the enemy, owing to the vigor of the attack of our formations which were rapidly brought up, especially of the Messerschmitt assault battalion and our own paratroops, most of which came in from the west. There existed, therefore, a justifiable expectation of being able to envelop the enemy completely, of cutting him off from the coast and of destroying him.

But the Americans recognized the danger which threatened them. They summoned their massed bomber squadrons and naval guns to shake the German attackers off, and made a supreme effort to establish contact with the forces that had landed in the meantime and to bring up reinforcements. But in doing this they met with bitter resistance. Only after hard fighting did they succeed—to cite an example—in silencing the Saint Marcouf coast defense battery which had sunk a cruiser and many landing boats and had slowed down the entire landing operation. After it had been eliminated, the fire of heavy naval guns was poured with increasing intensity onto the German formations. Thus, the burning ruins of Sainte Mère Eglise had to be abandoned by us again. But as a result of the three days of fighting, the intended surprise attack on Cherbourg by the Americans ended in complete failure and, above all, was accompanied by heavy losses.

As early as 9 June, the constant reinforcement of the Americans made itself felt. In the region of Sainte Mère Eglise they had landed more troops from the air, and had also brought up fresh formations, with many heavy weapons, from the beach northwest of the mouth of the Vire. Thus, on the German side a change-over had to be made from attack to defense. Because of the skill of our combat forces and their commanders at that time, a closed front was presented to the enemy, especially at Montebourg, which for an entire week held up all further advance. The original intention of the Americans of pushing rapidly ahead in force to Cherbourg by way of Valognes and of seizing this port from the rear was also prevented.

Thus, the enemy who had landed on Contentin saw himself forced to make considerable changes in his original plans. His next objective was to cross the peninsula, whose width is some thirty kilometers from Sainte Mére Eglise to the west coast, and cut off the defenders of Cherbourg. After his unsuccessful attack in the vicinity of Valognes, he directed his main pressure toward the west, where only weak forces of German reserves faced the growing superiority of the enemy. But even these were able to delay the enemy to such a degree that he did not reach Saint Sauveur-le-Vicomte till 16 June. Then, on 18 June, he really did succeed in plunging through to the west coast with tanks and motorized forces. Not till then had the Americans created the operational prerequisites for the conquest of Cherbourg.

Since 17 June the German front at Montebourg had also been under constant attack. The ruins of the city had to be abandoned, but even then our forces were still able to hold their own, and this in spite of continued bombing and shelling at Valognes and northwest of there, up to 19 June. The superiority of the Americans in the matter of artillery had become so considerable as a result of the continuing landings that they were already able to start their attacks at Valognes with a barrage lasting an hour and a half.

Hence, from 20 June on, the German command saw themselves confronted with difficult tasks. In a rational estimate of the situation, they decided to assemble the forces that had remained behind in the north after the peninsula had been tied off, and to defend with these forces the land front of the fortified port. In the main, this defense was carried out by army units the majority of which had been engaged in constant and heavy fighting since 6 June—the first day of the invasion. This fact must be especially emphasized in the estimation of what they accomplished. Even after the losses they had suffered in that period of time, they now had the task of holding a broad front of some fifty kilometers. Part of this front was organized in the form of permanent fortifications, but the greater part consisted of field fortifications only. Since connections with the south were cut off, the problem of the ammunition supply of forces not fighting in the immediate vicinity of the fortifications was a very difficult one to solve. In spite of these difficulties, however, our troops succeeded for several days in repelling repeated thrusts and breakthrough attempts by the Americans, including some by armored groups.

The advance of the Americans to Cherbourg was not, therefore, effected by means of vigorous attacks. They chose, rather, the tactics of filtering between the strongpoints with superior forces after laying down a heavy barrage, or of establishing themselves in the intervening areas after having smashed the field fortifications. At the same time, the continuous air bombardments continued, while the enemy naval artillery combated the batteries and strongpoints with heavy caliber guns. Thus, the numbers of the defenders melted away under the heavy fire. On 23 June they were forced to occupy a narrower defense ring and to fight close to the outskirts of the city of Cherbourg, with the support of the old French forts. A few advanced strongpoints far to the south, which the enemy fire had not been able to knock out, held out for a long time and cost the Americans a heavy toll in blood. On 23 June there no longer existed any doubt, however, that the final struggle had begun on the peninsula.

All the details have not yet been made known regarding the last heroic battles for the city and port of Cherbourg. The Americans succeeded on 23 June in reaching the outskirts of the city and penetrating into the city itself, but even then determined combat groups, rallying around their officers, continued the stubborn defense. The commandant of Cherbourg, Lieutenant General von Schlieben, had left two American demands for capitulation unanswered, and individual strongpoints of all three arms were ashamed to surrender to the enemy or to lay down their arms as long as they were able to fire. Long after the enemy had announced the capture of the city, there was still bitter fighting for bunkers and various fortified works. Avia-

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tors, sailors, and coast artillerymen also fought in the ranks of the army to the last cartridge. The coastal batteries were defended to the last shell. They were still able to inflict heavy losses on the enemy at sea and sank a large number of war vessels including two cruisers. Through their fire, the port entrance was barred even for smaller vessels. In addition, all installations had already been destroyed by powerful charges of explosives.

In the first days of July 1944, almost four weeks after the start of the invasion, the battle for the Cherbourg Peninsula came to an end. It was fought by our forces, who were not very numerous, in a manner that was laudable in the extreme. At first in bold attack, then in bitterly waged defense against the overwhelming might of the American matériel, they held out against all the allurements of capitulation, and in many of the strongpoints defended themselves to the last round of ammunition. The moral strength of the German army in the west has emerged not weakened by these battles, but rather strengthened.

We shall not attempt to comfort ourselves over the fall of Cherbourg. We have been forced to make a sacrifice in the face of the massed matériel of the Anglo-Americans. But even this sacrifice has borne its fruit, for by it time was gained for bringing up new forces and weapons. Hence, the Americans found themselves and still find themselves forced to engage in those frontal attacks against a closed front which they always prefer to avoid.

Variety in Russian Offensive Tactics

From an article by the Russian war correspondent, Vasili Grossman, in *Information Bulletin*, Washington Embassy of the USSR, 10 August 1944.

IT is extraordinary how consistently all along the front the Germans blundered in determining where our main and subsidiary blows would be struck. Where they massed to parry our tank assaults, only our containing troops were stationed. Where, as on General Batov's sector, the Germans did not expect large-scale activities owing to the swampy nature of the terrain, such swift and sudden blows were struck that the Germans gasped with amazement. Such was the case all along the front.

And this chain of minor blunders was worthily crowned by the supreme blunder of all the strategical miscalculations of Hitler's general headquarters. The Germans were certain that the main blow on the Russian front as a whole would be struck in the south and they prepared Modl to meet it. But when it came it was received by Field Marshal von Busch in the center.

What was the reason for the Germans' mistakes? Apparently it was because their powers of prognosis were strictly circumscribed by superficial and stereotyped views relative to the convenience of the terrain and by arithmetical calculations of distances. They prognosticated an offensive where the front was most advanced to the west, where the ground was most passable, or where road junctions were nearest. But the creative spirit of the men who planned our offensive chose a different course, unforeseen and unsuspected by the rudimentary thinking of the adversary. Marshes and forests proved to be passable, miles of road were laid across grass-covered swamps, and where it seemed that even a light-footed scout could not pass, our heavy tanks and large-caliber guns crossed with ease.

The shortest distance to the borders of "Fortress Europe" turned out to be not the geometrically straight line the Germans saw on the map, but a devious and fantastically serpenting curve conceived by the analytical geometry of war, a curve which ensnared the German central army in a threefold "kettle" —Vitebsk, Bobruisk, and Minsk. In this pre-

liminary contest the Germans were, to put it vulgarly, completely washed up.

The artillery preparation for the breakthrough was eminently successful all along the front, but on different sectors success was achieved in different ways. That is a highly significant fact. Bear in mind that the offensive did not begin simultaneously on all sectors, and one might have expected that the methods of breakthrough which had been successful on one sector would be faithfully copied on others. That would have been logical. With the Germans, the stereotype is law. The totality of methods which led to one success they unthinkingly and mechanically copied in all similar operations. But such duplication and canonization of methods lead to no good: stagnation of creative thought in war, failure to take account of the peculiarities of a situation—which, of course, can never be twice alike—gives the adversary a chance to study your methods and to work out ways and means of countering them.

On the other hand, the creative faculty, the rich variety of methods, and the complete rejection of a stereotyped pattern revealed by Soviet generals in the breaking through of the German defenses was something to wonder at and admire.

On one sector the breakthrough began with a mighty and devastating artillery preparation, systematically mounting in intensity and smoothly shifting from the first line of defenses to the next. This was preceded by air reconnaissance in force, of equal monumental dimensions, carried out by large forces of infantry and artillery. Many hours separated the reconnaissance from the artillery preparation. After 150 minutes of a torrent of steel and explosive, masses of infantry were thrown into the attack.

On a neighboring sector the breakthrough was effected in an entirely different way. Powerful artillery concentrations pounded individual sections of the German defenses. The superiority of fire at these points over that of the enemy was fantastic and was directed not at his first line of trenches but in depth, as it was assumed his troops had been withdrawn by communication trenches from the first moment artillery preparation began. Then, after a brief squall of fire, a sudden silence ensued. The enemy, according to established pattern, hastened to reoccupy the first line of trenches in expectation of an attack. Thereupon Soviet artillery opened up again, this time at the forward trenches. Again a brief silence and then, in defiance of all accepted ideas of time and space, a mighty "Hurrah!" was heard in the enemy trenches as the Russian infantry burst into them. But these were not the infantry the Germans expected; they were assault detachments, specially picked and trained and approved by the Military Council. They had massed secretly, under the very noses of the Germans, so near to the enemy trenches as to be endangered by fragments of their own shells.

A few days later came another breakthrough which differed completely in style from the first and second. Fire is opened and the enemy thinks along the customary lines: This must be reconnaissance in force; the real attack won't come until tomorrow, hence there is no sense in disclosing the disposition of my batteries. But suddenly he finds the reconnaissance in force turned into a regular offensive, and an avalanche of Soviet infantrymen floods his trenches.

There you have three different methods of breakthrough. We will not attempt to analyze which is the most effective. All we wish to stress is the unity of aim and the different means of attaining it; the absence of a hard-and-fast pattern in achieving success—the creative spirit in the initial and most important stage of the offensive.

In maneuvering warfare, stubborn defensive fighting is combined with outflanking movements, attack, and pursuit in an amazingly swift succession. At one moment the enemy is defending himself in a ramified network; he launches his forces in a fierce attack, breaks through, and attempts to surround his opponent. The changes of forms in maneuvering warfare are sudden, swift, and difficult to foresee. On a night when the enemy is beaten and scattered, a fresh division, rushed to the scene from his deep rear in transport planes and motor vehicles, may sud-

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denly counterattack. These rallies of the routed enemy may for a few hours constitute a serious handicap to the attacking side, threatening his flank and rear services as they move up along the roads.

To succeed under such circumstances—to effect a breakthrough and then at unparalleled speed to pour troops into the breaches, pursue the enemy, surround, and annihilate him—demands a high type of commander proficient in the art of combining offensive and defensive action. No adept in offensive fighting could cope with the intricate and exacting tasks of maneuvering warfare under such circumstances if he is not at the same time adept in defensive fighting. This indeed is the essence of maneuvering warfare, and our generals, officers, and men have passed with credit the test of creative synthesis of offensive and defensive operations.

Individual Combat of Tanks

Translated at the Command and General Staff School from a French article in *Revue Militaire Suisse* January-February 1944.

In spite of an abundance of antitank weapons, many armies, including the German army, have developed special methods of fighting tanks at close range.

This individual combat of tanks is now taught to officers and soldiers of all arms. Thus, artillery, infantry, cavalry, motorized troops, and even tank crews specialize in this form of combat under the direction of experienced training officers. As a result, it is claimed that thirty percent of the tanks destroyed are knocked out in these close engagements and by the individual action of antitank fighters.

Since tanks attack either in waves or in groups, it has been necessary to adopt tactics which permit of acting against them while remaining under cover. The tanks provide each other with mutual fire protection and possess, therefore, a formidable defense against individual action. This makes necessary a high degree of preparation and training on the part of the attackers.

The first requirement for the fighters is nerves of steel. They must not be afraid of tanks and of their enormous and rapidly moving weight, and they should also be aware that their own agility is considerably superior to that of the tanks.

The attackers are trained to leap on the tanks unexpectedly, observing carefully the dead angles in the field of fire of the tank weapons. Thanks to this training, they learn to regard the tank as a machine which does not possess unlimited means of destruction, and an accurate knowledge of the danger that has to be overcome is established. Action on the part of the attacker is possible only in the space within the dead angle, which varies between ten and twenty meters depending on the height of the tank and the position of the weapons. The confidence acquired by the tank fighter and the disappearance of the feeling of inferiority when confronted by a gun represent the highest degree of preparation.

Stationed in individual, cylindrical holes of sufficient depth to hide them completely, the attackers are entirely under cover. Tanks can pass over them without touching them.

The weapons at the disposal of these men are smoke-generating, incendiary, and explosive devices.

By means of the first, at short range, they blind the tank crews, making it impossible for them to maintain contact with one another or to defend themselves. Under these conditions, the tank halts, which is exactly the result desired. Hand grenades which spread a dense smoke constitute the simplest method of isolating the tank, making it possible to approach it and destroy it with powerful explosives applied to seams and openings. We might note in passing that the tank crews can take advantage of this moment when they cannot be seen to leave their tank and seek cover.

There is also used a yellowish liquid in glass bottles which, hurled against the tank as it passes, break and produce a very dense smoke which penetrates to the men, depriving them of air. They then have no other recourse but to leave the tank. The more powerful the motor, the stronger the draft toward the interior of the tank, which explains the ease with which the smoke penetrates the driver's compartment.

Bottles filled with gasoline and provided with an inflammable primer are very effective. When hurled against the tank, the flaming liquid passes through the openings of the various parts of the machine. A two-liter sheet-metal container to which is attached a hand grenade is also employed. The device is skilfully placed at a vulnerable spot in the armor plating, and the quantity of liquid catching fire when the explosion occurs is so great that the whole interior of the tank is invaded by the flames and it is absolutely impossible to remain in it. There is little chance for the crew to escape.

Various flame throwers are also employed in individual combat of tanks. The results are terrific. The air that is drawn in sucks the flame into the interior of the tank, incinerating the crew and setting fire to the gasoline tank and ammunition.

The employment of explosives is more varied and requires a special technique. One of the commonly used methods is the employment of multiple charges of high explosives placed in a wooden box and hurled against the tracks or placed in the path of the tank. As soon as either of the two tracks is broken by an explosion, the tank is stopped and is then more easily knocked out. A chain of mines, one causing the explosion of another, may be placed in a group, constituting another method of destruction. Two charges fastened together by a piece of wire and hung astride the barrel of the tank gun may bend or burst it by the force of the explosion.

The magnetic mine remains an extremely powerful weapon. By a special arrangement, it is attached to the armor of the tank. The German *Hohlgranate*, for example, concentrates the explosion on a single point (hollow charge principle) and the effects are enormous although a relatively weak charge is employed. The only inconvenience of this weapon is that it should be placed directly on the armor, as it is not possible to hurl it at the target from a distance.

The emplacements occupied by the men engaged in individual tank combat are arranged in such a way that the men are always to be found in two's. They also provide for the mutual protection of one another.

The attacking wave of tanks is frequently supported by detachments of infantry riding on the tanks themselves. The first thing to do, therefore, is to take them under the fire of automatic weapons in order to force them to separate themselves from the tanks. At this moment, heavy infantry weapons are also required in the action. Especially, antitank guns attempt to prevent the tanks reaching the main line of resistance in numbers. Nevertheless, in spite of all these efforts some of them will manage to penetrate into the position. It is here that the individual combat of tanks is of decisive importance. Each man chooses the tank that presents itself most favorably. As soon as it has been blinded and stopped—or even if it continues on its way—the tank hunter leaps forward and places a charge on it which wrecks one of the tracks or some other vital part. He then attempts to set fire to it by attacking it from the rear in order to get at its motor and fuel tank. The flame thrower is directed at the sighting and vision slits in order to knock out the occupants. At the same time, other individual activities may take place, as indicated above. The fire of friendly weapons covers the attacker as he performs his work. He is, therefore, effectively protected from the danger of being struck by fragments of hand grenades thrown at him from the interior of the tank.

To conclude, there are three distinct phases in individual tank combat:

1. Separate the tanks from the supporting infantry.

2. Stop the tanks by blinding the crews.

3. Destroy them.

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Smashing the Gustav Line

Digested at the Command and General Staff School from an article by the editor, Lieutenant Colonel R. M. Raynsford, in *The Fighting Forces* (Great Britain) June 1944.

CAMPAIGNS are to a large extent governed by climatic conditions. The summer in southern Italy is enervating and exhausting. It was obviously sound to start the attack in Italy in time to allow the objective to be attained before the full effects of the Italian summer could make themselves felt.

The immediate objective was the smashing of the Gustav Line, and of the Adolf Hitler Line which lay some twelve miles behind it. General Sir Oliver Leese, Commander of the 8th Army, explaining his plans to war correspondents on the day before battle was joined, said, "The defenses which we are now attacking are the strongest which the British Army has encountered in the present war."

Why, then, it may be asked, attack such positions? The answer is obvious. It had become of paramount importance that we should establish direct land communication with the troops on the Anzio beachhead. The two forces, when joined up, would constitute a tremendous menace to Kesselring and his forces in Italy. Although the German defenses were admittedly formidable, we had immense advantages on our side. We had overwhelming superiority in the air, and in guns and tanks we far outnumbered the Germans.

The Gustav Line extended for about thirty miles inland from the Gulf of Gaeta, i.e., roughly from a point just west of Minturno to a point beyond Cassino (see sketch).

Opposite the Gustav Line were drawn up, on the right, the 8th Army, consisting of British, New Zealanders, Indians, and Poles; on the left, the 5th Army, consisting of French and American troops, French on the north and Americans on the south, the latter reaching as far as the sea. The dividing line between the two armies was roughly the Liri valley, inclusive to the 8th Army. The advance up the Liri valley, the most intricately defended sector of all, was wholly an 8th Army responsibility. The 8th Army had recently been regrouped and reinforced and had extended its front across the Apennines down beyond Cassino to the Liri. This elaborate operation had been accomplished without the knowledge of the enemy, a remarkable tribute to our air superiority.

And so, at 11 PM on 11 May, on a moonlit but foggy night, the attack started, heralded by a bombardment from our guns greater even than that which preceded El Alamein. By 12 May the enemy outpost line had been driven in, and the 8th Army had established bridgeheads across the Rapido River. The most magnificent work was done by British and Indian engineers, who made their bridges while German mortars cracked and blasted all around them, and amidst a hail of machine-gun bullets.

By 14 May the bridgeheads had been formidably built up, and Sant Angelo had been captured by Gurkhas, supported by American tanks, while the French troops made the most spectacular advance of the whole front, not only capturing Castelforte but seizing Monte Faito and Monte Majo, each of them at least 3,000 feet high. They also took 200 prisoners. Nearer the sea, the Americans were fighting their way across the top of Monte Damiano and up the road which leads from Minturno to Ausonia.

North of Cassino, the 1st German Parachute Division made five successive counterattacks which were bloodily repulsed. The high ridge which overlooks the village of Piedimonte San Germano saw most of the fighting. Here the 1st German Parachute Division, the most nauseating types of the whole Nazi Army, young, brutal, ultra-fanatical, utterly callous, were opposed by Polish troops. It must have given the Poles infinite pleasure to destroy these Nazi brutes in large numbers. Yet the fighting was very severe and the Hun counterattacks did succeed in holding up the Polish advance. This was, in

fact, the only part of the line where little or no progress was made.

On 16 May the newspapers came out with large headlines. "Allies Have Smashed Gustav Line," appeared in *The Daily Telegraph*. In the Liri valley British and Indian troops were making steady progress and had advanced on an average of 2,000 yards beyond the Rapido. The Poles, after a terrific struggle, finally secured the high ridge mentioned above. The French, who were fighting in two columns, on the north captured San Andrea, San Ambrogio, Vallemaio, San Apollinare, and San Giorgio, while their southerly column stormed into Ausonia and had reached a point five miles from Esperia, on the Adolf Hitler Line.

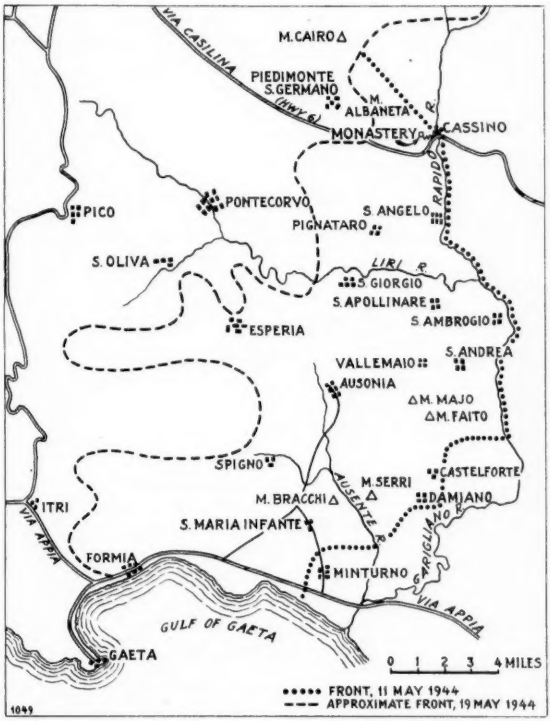
South of Ausonia, American troops cleared Monte Bracchi and Monte Serri, on either side of the Ausente River, and were advancing on Spigno, while farther south still they captured Santa Maria Infante and cut the Ausonia-Formia road.

In all, sixty square miles of mountain territory had been captured by the 8th and 5th Armies, and two thirds of Kesselring's Gustav Line had been smashed. Even the cautious official communiqué allowed itself to say that "a significant breach had been made in the Gustav Line." The number of prisoners taken since the start of operations was over 3,000. Haggard, dirty, unshaven, they seemed dazed for the most part, but still preserved the customary sullen Nazi demeanor.

The casualties inflicted on the Huns had been admittedly enormous. The Adolf Hitler Line now lay ahead. This line branches off from the Gustav Line at Monte Cairo, five miles north of Cassino, and runs through Pontecorvo and San Oliva, reaching the sea at a point about fifteen miles from Terracina [not shown in sketch].

It was officially announced on 15 May that a South African armored division had arrived in Italy. Most of this division consisted of seasoned troops who had fought in East and North Africa.

During the fifth and sixth days of the great attack our progress was, on the whole,



entirely satisfactory. Admittedly the enemy still continued to hold the mountain heights northwest of Cassino, and the Polish company, which had captured Phantom Ridge, overlooking Piedimonte San Germano, had even been forced to withdraw. But there was some compensation for this setback. The enemy, at this part of his line, as we have mentioned above, consisted of the 1st Para-

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chute Division. They held on to their ground with the fanatical zeal that one expected of them, but in doing so they suffered very heavy casualties at the hands of the Poles, and the more of this poisonous breed that are liquidated the better it will be for humanity in the future. On 17 May, for example, there was a most bitter fight for Mount Albaneta, a key-point of the German defenses around the Benedictine Monastery. The Poles fought with fury and frenzy. At one point they had to swarm up the face of the mountainside on rope ladders. They only gained a little ground, but in hand-to-hand attacks they managed to kill a very large number of the parachutists.

British troops continued to make their slow, unspectacular, but immensely important advance up the Liri valley, important because this advance, on the northern side of the Liri, was beginning to threaten Highway 6 (Via Casilina), the German supply line to his positions on the Cassino heights and in the town itself. In fact, British troops, overcoming numerous counterattacks, were by now within three-quarters of a mile of this vital supply route, which was under mortar and machine-gun fire. Indian troops captured Pignataro, thus clearing the northern bank of the Liri as far as this town. The French troops continued their pursuit of what had now become a disorganized enemy, and the Americans pushed farther along the coast and along the Appian Way [Via Appia].

Late on 18 May, General Alexander's special communiqué read as follows:

"Cassino and the monastery have been captured. The final assault on the town was carried out by British troops, while Poles took the monastery.

"The enemy has been completely out-maneuvered by the Allied armies in Italy after the original breach in the Gustav Line by the 5th Army on 14 May, and the subsequent rapid advance of French and American troops through the mountains.

"Troops of the 8th Army fought their way forward into the Liri valley, and during the past twenty-four hours have developed a decisive pincer movement which cut Highway 6 and so prevented a withdrawal by the enemy.

"A substantial proportion of the 1st German Parachute Division has been destroyed in its effort to escape. Both armies contributed to this triumph. The Gustav Line south of the Apennines has now ceased to exist."

The Germans, in their flamboyant propaganda, had stated that Cassino would be held to the end. The 1st Parachute Division, intoxicated by a belief in their invincibility, held on too long. They attempted too late to break out along the highway and mountain tracks and half of them were destroyed. The Polish Corps was largely responsible for containing them by the fury of their attack on Mount Albaneta, which they captured on the morning of the 18th, then moving on to seize the monastery.

Thus ended the first phase of this brilliant operation. In just under a week the Gustav Line had been utterly smashed.

Perhaps chief credit must go to the Allied artillery. The barrages which they had been able to maintain throughout the operation had been of an unprecedented strength, accuracy, and fury. After the last terrific barrage laid down on Cassino itself during the night of 17-18 May, white-faced Germans of the Parachute Division, Hitler's "death or glory" troops, came out of their foxholes waving white flags.

The spectacular success of the French Colonial Corps, who made such a sensational drive across the Ausente valley to smash the southern end of the Gustav Line, was a feature of the operations.

The American troops, in the coastal zone, showed splendid fighting qualities. They pushed along the Appian Way, doggedly and determinedly, and captured the important port of Formia, terminus of the Pico-Itri road, on 18 May. This thrust jeopardized the hold of the Germans on the whole Gaeta peninsula.

Air cooperation, both tactical and strategical, was of the massive and highly efficient character that we have been taught to expect in the whole Italian campaign. We hold a twenty-to-one superiority in the air in

Italy, a superiority which will become even more overwhelming as the advance continues.

Throughout the advance, Allied warships were able to afford most effective aid to the American troops working along the coastal area.

The total number of prisoners taken since the opening of the attack on 11 May exceeded 4,500, and there is no doubt the number of Germans killed was enormous.

Finally, we must pay a tribute to the masterly manner in which the whole operation was planned by General Alexander and his staff. Their skill and the brilliant performance of their troops gained a very great victory.

Cooperation Between General and Artillery Staffs During Offensive Operations

Translated and digested at the Command and General Staff School from a Russian article by Colonel G. Vycherov in *Krasnaya Zvezda* (Red Star) 22 April 1944.

IN THE course of this war, our staffs have acquired vast experience in the organization and establishment of cooperation on the battlefield, but cooperation among the staffs of various arms is often overlooked. The work of the staff of the N-th Army (First Ukranian Front) is a good example of such cooperation.

When the staff of this army receives a new mission and only limited time is available for the preparation of the units, the artillery staff is immediately informed of the new mission. Similar procedure is used when a mission in the course of accomplishment has to be changed. All unit staffs are immediately informed of the changes in the situation or in the mission, and this has been one of the most important factors in the effectiveness of our artillery, especially in pursuit operations.

As is known, all the data needed by the commander for making a decision are prepared by the staff. If the chief of staff makes a correct estimate of the situation, if he knows the capabilities of each of the artillery units, their location, missions, etc., it is natural that the instructions transmitted to the artillery by the chief of staff will hardly be changed by the commander.

As a matter of fact, such changes have occurred very seldom. When our [artillery] units receive field orders and directives, the officers are already prepared for their execution. This is how it works: The staff summons liaison officers who are told what the new missions may be, and how and what units are expected to participate in their accomplishment. If the units are on the march and without any definite fire missions, they are halted and ordered to reconnoiter the new route (if necessary), to get in touch with the infantry commander requiring the support of the unit, etc.

Such preliminary measures enable the artillery to begin the execution of the combat mission right after the commander has made his decision. Thus the time usually required for preparations is reduced, and the possibility of the separation of the artillery from the infantry unit is excluded.

Sometimes the artillery can start the execution of its new mission right from the march formation, which is particularly important in pursuit operations.

Joint and simultaneous preparation of operational documents [plans or orders] in both the general and the artillery staffs is also of great importance, especially when time for the preparation of the operations is limited. The work of the army staff begins as soon as the order to advance is received. If the order is received in the evening, the staff will work all night. The army artillery staff will get all the necessary documents in the morning, and it will take some time to prepare a plan for the artillery. Thus, the documents from the army general staff will reach the infantry division staffs long before similar artillery documents are received by the division artil-

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lery staffs. While the infantry will be ready for action, their supporting artillery units will not. Moreover, much time will be required for reconnaissance and for the establishment of cooperation.

Joint and simultaneous preparation of documents as practiced in the staff of the N-th Army, where the cooperation of all staffs is continuous, enables all types of troops to prepare simultaneously for their missions and to establish cooperation down to the smallest units.

Another important problem is the work of staff officers in the units. This work is very important during offensive operations and is even more so during pursuit. Command liaison officers assigned to troop units should know everything that concerns not only the infantry, but also the artillery. They must check on how the infantry and artillery accomplish their missions, how their cooperation is established, what help they need, etc. They can do all this provided they have previously familiarized themselves in the artillery staff with the missions of the artillery and its capabilities.

The same applies to artillery staff officers assigned to troop units. They should receive from the general staff detailed information concerning the missions of the infantry in the given sector. Then it will be easy for them to verify on the spot how the artillery supports the infantry and how effectively cooperation is established. Moreover, they will be able to help the infantry commander in the use of the supporting fire means.

In conclusion, a few words about the organization of reconnaissance. Joint action of the staffs in collecting information of the enemy, timely mutual information about the situation, and joint analysis of reconnaissance data are extremely important. It should be mentioned in this connection that some artillerymen still send to the general staff their reconnaissance overlays and reports on new targets without any comments whatever.

Here cooperation of the staffs should be continuous. In the period preceding the attack, when a thorough study of the enemy is going on, the artillery staffs should be required to supply the following information: number and disposition of enemy artillery and mortars, their calibers, activity, and possible directions of their massed fires; number and precise location of enemy firing emplacements and of antitank guns; number and location of enemy observation posts, etc. The duty of the general staff is to obtain and transmit to the artillery, information concerning the location of enemy reserves and their headquarters, warehouses, and supply bases.

In order to obtain information on enemy fortifications, strength of their construction, number of embrasures, and fields of fires, as well as the location and character of antitank and antipersonnel obstacles (barbed wire, ditches, minefields, etc.), a joint reconnaissance is necessary. The artillery staffs then assign their men to infantry reconnaissance units. When aircraft is given a reconnaissance mission, the artillery officer should give the flier definite information as to areas where enemy artillery can be found and how the location of enemy batteries can be detected. When missions are assigned to the artillery aircraft, the fliers should be instructed as to what information is needed by the general staff. Joint photo-interpretation is also very useful.

Jet-Propelled Planes

Translated at the Command and General Staff School from a Spanish article in *Revista de Aeronautica* (Spain) January 1944.

NUMEROUS flights have been made of late months in England and the United States with jet-propelled planes. The initial work was carried out with such secrecy that the first announcements of these flights and the brilliant results obtained were not made pub-

lic until January 1944. Many of these flights were effected at great altitudes and incredible speeds were attained, of which the figures have not yet been made public.

An early model of the type used at present, the "Whittle," was described in September 1941 in an English review. Its propelling device is located in the tail of the plane. A compressor of the ventilator type sends a powerful current of air through the system. All the air necessary for the compressor, along with the gases from the burning of the combustion charge, passes through a single turbine which moves the compressor. The air may be admitted through a series of orifices turned in the direction in which the plane is traveling, or through a series of ventilators very similar to those on boats, placed in such a way that they pick up the air from the layer enveloping the fuselage.

The jet-propelled planes that are at present being manufactured by mass production methods probably possess many improvements and refinements as compared with the original. It is known, however, that they have two twin propelling units mounted on double girders at the tail of the plane, which may cause their silhouette to be confused with that of the Lockheed "Lightning" P-38. As we have said before, data concerning their speed, flying qualities, and other characteristics are still unknown and are official secrets.

The advantages offered by propellerless planes have impelled many technicians and scientists to engage in experiments ranging from rocket planes to the most complicated weapons of destruction. Even the Greeks recognized the possibility of propulsion by means of reaction, and thus a hundred years before the time of Christ a globe was caused to turn by jets of steam issuing from nozzles located on opposite sides of it.

The principal advantages to be had from this jet propulsion are greater efficiency of the propelling motor unit at great altitudes, greater climbing speed, and the possibility of attaining enormous velocities. The propeller of a plane screws its way through the air, but at great altitudes where the air is less dense the pitch of the propeller is increased and it is no longer able to work its way through the air with the same efficiency. Thus, if the ascent is continued, an altitude will be reached where there is not enough air for the propeller to fulfil its mission, and the plane then loses its lift and drops to denser layers.

The propelling unit, operating on the jet principle, injects air which is mixed with fuel and compressed in a manner very similar to that in which the carburetor of an automobile mixes the air with the gasoline, and then ignites the mixture, thus giving rise to an enormous expansion and to an intense current of gases which operates the turbine driving the compressor. Passing through the blades of the turbine, the gases are forced backwards through a nozzle similar to that on a fire hose. The action of the compressed gases, on being expelled, provides the impulse for driving the plane. In the cold and rarified atmosphere of great altitudes—and this is where the plane of the current type begins to meet with difficulties—the gases expelled by the reaction plane expand at even greater speed than at lower altitudes, thus obtaining relatively more effective results.

As regards the pilot, the impressions that he experiences with this new plane are lack of noise and absence of vibration. Recently, a well known American expert said in speaking of this type of plane: "The elimination of the propeller in the case of reaction propulsion diminishes, to a very large extent, the noise in the cabin of the pilot. The sound goes backward and the sensations of the pilot are those of calm and relative quiet."

The vibration arising from powerful motors and the deafening noise coming from propellers are causes of fatigue in the pilot. The absence of vibration also means greater ease in the handling of the plane, especially in very close order maneuvers, and a notable elimination of the strains to which the framework is subjected. An advantage in manufacture is the absence of the ignition system of the normal plane. The difficulty due to the fact that the propellers of very powerful modern planes are subjected to interference

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when the plane is rolling on the ground is completely eliminated.

The experimental plane flying for the first time over England was the cause of great confusion. According to an eyewitness, the plane announced its approach by a very shrill whistle which increased in volume until, combined with the sound of the motor, it resembled the sound of an enormous bomb hurtling to earth or the sound of a boiling tea kettle, causing many people to rush to bomb shelters till they got used to it.

In adapting this propulsion to the pursuit plane, the obstacle hitherto encountered consisted in the difficulty of producing an efficient compressor and a practical turbine, and only during recent years have metallic alloys been discovered capable of resisting the enormous heat generated by the burning gases. Another important obstacle was the great consumption of fuel which diminished the radius of action of these planes. To what extent these difficulties have been overcome in the case of the "Whittle" has not yet been made known.

The first attempt to construct a jet-propulsion motor was made by the Russian, Tsiolkovski, who published a book on the subject in 1903. Four years later, an American, Professor R. G. Goddard of Clark University, carried out experiments with rockets, the intention being to use them eventually for the crossing of interplanetary space. It was Goddard more than any one else, perhaps, who maintained interest in this type of motor till it reached the high point of perfection possessed by it at the present time in the United States.

Various English, French, Russian, Italian, and German scientists have been working along these lines in recent years, and in 1940 the Italians succeeded in constructing a plane propelled by reaction. The first of these planes, the Caproni-Campini, made use of an ordinary propeller for getting off the ground, then shifted to jet propulsion as soon as it was in the air. The second model, propelled exclusively by a jet motor, made a flight from Milan to an air field near Rome, a distance of approximately 268 kilometers, at a mean speed of 152 kilometers per hour. After the initial flight, nothing much was heard of this plane, and the publication of its photographs indicated that the Italians did not believe it merited secrecy. The German Rocket Society also experimented with various motors.

Of the work going on at the present time, it is known only that the development and perfection of the new and revolutionary plane are due to Lieutenant Colonel Frank Whittle of the RAF who took out the first patent on the machine now bearing his name in 1930, but for several years had little success with his attempts. Afterwards, in 1933 while he was studying in Cambridge University, Whittle explained his theories to four of his friends, former aviators of the RAF and owners of a small company. Arrangements were made for obtaining money, and a company, Power Jets, Ltd., was formed for continuing the work of Whittle. In 1939 the British Air Minister gave the first order for planes with jet-propulsion motors to the Gloucester Air Craft Company, and in May of 1941 these planes were ready. At that time the first important flight was made with this type of plane. Two months afterwards, the English placed at the disposal of the Americans all data relative to this new plane and new experimental models were made ready for the final tests by both forces.

Pamphlet Raids

From a British source.

BRITISH and American airmen have been dropping more than seventy-three million leaflets monthly over Europe. During the first four and a half years of the war, the RAF's total circulation was over one and a quarter billion leaflets, newspapers, and magazines.

The RAF's Bomber Command took up the

delivery job within a few hours of Britain's declaration of war on Germany in 1939. Techniques have improved continually. In 1939 leaflets were packed in bundles weighing approximately seven pounds each. Over the target a member of the crew cut the string and emptied the contents down the flare chute.

At the beginning of the present war, fully-trained bomber crews were used for this work, but now Operational Training Unit crews get the assignment as the final stage of their training. In addition to being briefed about their target in the same way as they would be for any other operation, they are also briefed about the ammunition that they drop. They are given translations of the messages and newspapers that they are to carry, and their purpose is fully explained.

The job is to scatter them over towns and not in the countryside where the chance of being picked up is a good deal less. Bombers going over to Germany often carry bundles of leaflets in addition to the bomb load. These are stored in parts of the aircraft where bombs cannot be carried. Thus the normal bomb load is not reduced. Sometimes the destination of the bundle will be Holland or Denmark, if it is on the route to the target in Germany.

For the first six months of the war, Germany was the only market for RAF literature. Berlin received its first consignment on the night of 1-2 October 1939. The Berliners who read these leaflets learned about huge personal fortunes which Nazi leaders had hidden away abroad. Today German cities are receiving a regular delivery of the RAF *Luftpost*, a four-page illustrated weekly which tells its readers a great deal of interesting, though depressing, information, which they are unable to obtain through Dr. Goebbels' channels. They learn how, one by one, Germany's industrial centers are being destroyed by the RAF and the USAAF. They also get details of the Russian victories and the German defeats in Italy and Normandy, and discover that Doenitz's U-boats are sinking only one ship in a thousand. They see pictures of hoards of German soldiers taken prisoner. Shortly after the Allied victory in North Africa, they were shown a photograph of General von Arnim arriving in England as a prisoner of war.

There is also a monthly magazine, *Die Andere Seite* (The Other Side). This is a 32-page pocket-size magazine printed in rotogravure. From it German readers discover what world thinkers have to say about the war and its consequences for Germany.

There is plenty of evidence that this literature has its effects. A German prisoner of war in England received a letter from his mother in Essen saying, "When leaflets from the air fell into our garden showing prisoners of war from Tunis, you could be recognized easily." Of a batch of forty-one German soldiers who surrendered to Allied troops in Italy, nine had leaflets in their hands, two had them in their shoes, one in his watch, and others in their pockets.

In World War I, the leaflet campaign was conducted by a team of famous writers, including H. G. Wells, under the direction of Lord Northcliffe. The success of that campaign was confirmed by Hindenburg, Ludendorf, and the Kaiser. In this war the job is done by a large number of experts, from specialist writers, political observers closely acquainted with Germany and German-occupied Europe, to engravers, typographers, and proof-readers. Among them are refugees from the enslaved countries. A score of printing shops are secretly engaged on this high-priority task.

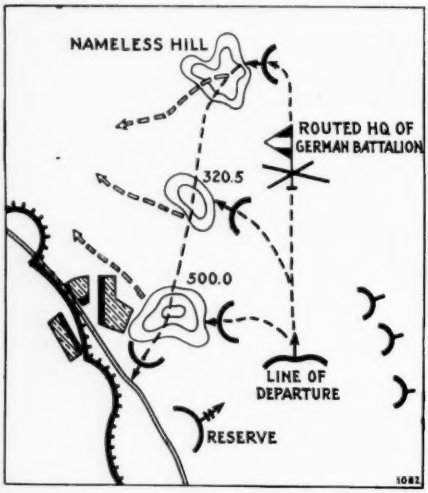
Attack From the Rear

Translated at the Command and General Staff School from a Russian article by Major P. Zaprivodin in *Krasnaya Zvezda* (Red Star) 18 June 1944.

THIS battle took place in mountainous terrain. The enemy, having failed in his attempt to retire along a highway, bypassed our units and, taking advantage of a weak spot in our

battle formations, reached two hills, one of which commanded a large populated place. Through this populated place passed a dirt road which connected with the highway we had taken from the enemy.

The Germans occupied Hills 500.0 and 320.5 (see sketch) and menaced our units located in the populated place, which was well observed from the western slopes of Hill 500.0 and was within the effective range of the enemy's medium and heavy mortars. Obvious-



ly, the enemy intended to capture both the populated place and the dirt road. He began concentrating his forces on both hills, and his small groups of tommy gunners managed to occupy the eastern part of the populated place located at the foot of the hill.

The situation was very tense. By exploiting his success, the enemy was likely to appear in the rear of our troops holding the highway. In order to prevent this, it was necessary to stop the advance of the enemy toward the dirt road and to knock him out from the hills.

The commander decided to commit in battle the reserve unit of Colonel G. This unit was located far from the combat area. It made a long march under difficult conditions. The men carried ammunition, grenades, and rations for three days. The time given for the preparation of the attack was limited to the minimum. The commander received his mission while marching.

After a short command reconnaissance, the regiment occupied its position of departure. This was done at night and along the routes marked in advance. Pieces of phosphorescent rotten wood were successfully used for marking directions and boundaries.

Hills 500.0 and 320.5 are three and a half kilometers from each other, and are connected by a saddle-shaped and wooded elevation. The approaches to both hills are very difficult. The first hill is steep and inaccessible; only its eastern and northern slopes are gentle. These slopes were protected by a many-storied system of firing emplacements and minefields.

The second hill (north of the first one) has gentle slopes. Near the top of the hill the Germans had built three rows of trenches and earth and timber emplacements. On the northern slopes of the hill the enemy's fire system was the weakest. Thus both hills turned out to be most vulnerable from the north. But to launch the assault from the north it was necessary first to penetrate into the enemy's rear. Colonel G. decided to try it. Having left one-third of his forces in reserve and having covered his exposed right flank by a small rifle unit, he launched the attack. Most of the units participating in the attack were those commanded by Major K.

While two of his companies feinted an attack against the eastern slopes of the hills, Major K. penetrated with his main forces (including a submachine-gun unit) into the enemy's rear. The reconnaissance platoon marched ahead. Moving ahead of the units, the men with submachine guns began outflanking the hills from the east and northeast. The operations began at dawn without artillery preparation.

The battle formation of Major K's companies consisted of small groups echeloned in depth. The groups followed each other and maintained visual contact. Open stretches were overcome by rushes under the protection of automatic weapons.

Having reached a point northeast of Hill

320.5, Major K. rushed and routed the headquarters of a German battalion. Here our troops put out of commission the enemy's wire communication system—about ten lines stretching to the hill positions.

Soon the attackers reached the Nameless Hill and engaged a German company which was resting on their way to reinforce the enemy units defending the hills. In a short hand-to-hand fight the German company was routed. Major K. then turned abruptly around to approach the hills from the north. At the turning point he left a small group of submachine gunners to cover his rear.

The Germans, worried by these decisive operations, called out their aircraft. Twenty-seven bombers escorted by six fighters began bombing and strafing our troops. This group of planes was relieved by another group which was in turn relieved by a third one. The raids of the German aircraft lasted throughout the latter part of the day, and our troops had to move more cautiously. Major K. resumed the high tempo of the advance only at dusk, and captured Hill 320.5. Leaving a small garrison on the captured hill, he launched an assault on Hill 500.0. The enemy was demoralized and cut off from his rear. Hill 500.0 was taken by two simultaneous assaults launched from two directions, from the north and from the east.

This battle is characterized by its daring and simple conception, as well as by its dynamic execution. The formation used by the commander was also interesting; small rifle units following and parallel to each other and maintaining visual communication. This formation is good for advancing through woods. Most of the machine guns moved in front and on the flanks.

Special assault groups were assigned to combat formidable firing emplacements. Each group was composed of an antitank-rifle crew and of two or three men with submachine guns. Since orientation in the woods, especially in mountainous woods, is difficult, shrapnel bursts and smoke shells were used for indicating directions. In mountains, such bursts are visible from any point and at a considerable distance.

Strategy and Tactics

Translated at the Command and General Staff School from a German article by Lieutenant Colonel Benary in *Süddeutsche Sontagspost* 4 June 1944.

WHEN, in ancient Athens, an overwhelming enemy beset city and state, the best man was picked as general* to meet the emergency. Miltiades, the victor of Marathon, was—as far as historical records go—the first man to bring honor to the title of *strategos*. The Athenian army being so small, the general himself had charge of the position in battle of each individual man. In order to be able to do this, he had to be master of *taktike techne*—the art of disposition—and was, therefore, strategist and tactician in one person.

Name and office, in the form of *strategy* and *tactics*, have, in the course of the centuries, become terms of military science familiar even to the laity. To interpret them accurately, to differentiate between them sharply—and the best of military heads have always tried to do this—is difficult if not entirely impossible, for they vary with the types of combat, with the technical means of combat, and with the period, and in many fields overlap one another.

Strategy covers the whole of the broad field of higher leadership, the formulation and execution of plans of campaigns. Calculations relative to time and space form, according to a statement by Gneisenau, the basis on which deliberations with regard to strategy are made. Jomini, the great military theorist among Napoleon's followers, clothed the same thought in this form: "Strategy is the art of shifting the masses on the field of battle."

*The word translated as "general" in this article is "*Feldherr*" in German, "commanding general."

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Clausewitz, whose thoughts ran in a more philosophical manner than either of them, recognized that strategy, in addition to purely mathematical conceptions of time and space, had also moral, physical, mathematical, geographical, and static elements. He counted as moral elements the will to fight and the combat worth of the troops; as physical elements, their numerical strength and the amount of weapons and equipment at their disposal; as mathematical, the location of their initial base, the possible directions of their attack, the matter of fighting on external or interior lines; as geographical, the advantages and disadvantages of the combat area, of the climate, of the season; as static, the bases for food and raw materials—the question of their supply.

Thus he approaches the conception of strategy that we have today in considering total war. According to this definition, political and military leadership are not separable from one another. Just as the statesman must have a soldierly heart, a soldierly viewpoint, a soldierly instinct, so also must the general, the strategist, possess a mind that is apt for political, economic, and propagandistic problems. In his armies, his corps, and his divisions he must not see lifeless chessmen that he can shove here and there according to the rules of a game, but living organisms whose combat worth he will weigh carefully and place only where their presence will give promises of success. A well-known military writer had quite the right idea in the phrase "psychologist-general" coined by him. No one must have his hand more on the pulse of those under him than the general. The picture drawn by military theorists of the general of the future—the modern Alexander who, bending over maps far behind the front, conceives the orders for the columns of his armies and, without setting eyes on the naked facts of the battle, confides these to paper, to the wires, to radio—was wrong and was very soon set right by the events of the World War, and above all by those of the present war.

Today, just as in the days when he personally led the charge of armored knights, the commander in chief of an army, the strategist, must be a corporeal personality performing his part in battle and manifesting readiness for sacrifice in full view of his men. He must, in the truest sense of the word, possess the nature of a leader. The chief of the general staff—hence, the tactician—was able to say to Prince Friedrich Karl at the height of the crisis in the battle of Vionville-Mars la Tours: "The arrival of your royal highness on the field of battle is worth an army corps."

Great leaders of their people have, therefore, always been good strategists, and great strategists have always been good leaders of their people, true statesmen. Alexander of Macedonia, Caesar of the Romans, Frederick the Great of Prussia are historical examples of this. That the brainy, strategic mathematician, Napoleon, was not rooted in his nation, did not take into account sufficiently its feelings and ways of thinking, and did not rightly estimate the limits of its ability may have been to blame for his fall.

Strategists like Moltke never lost sight of the political, economic, and psychological aspects of their sphere of action. Thus, Moltke was one of the first men of Germany to recognize the importance of railways in peace and war. Moltke's fine, psychological instincts are sketched by Count Schlieffen in his concluding observations of the battle of Langensalza: "The Prussian generals, as excellent and outstanding as they may have been, were not able to reconcile themselves to the line of thought of the hoary theorist who had never led a company. They held tenaciously to the views that they had acquired from often misunderstood Napoleonic doctrines and the lessons gained by long years of maneuvers. Moltke sought indefatigably and calmly, time and again, to restore the broken circle. First, he confined himself to kindly admonitions. In the end, he was obliged to make use of imperial decrees of the severest sort. That he, however, had his way and led everything to a happy conclusion was certainly not the least of his accomplishments."

In the case of the two pairs of generals, Hindenburg and Ludendorf, and Mackensen and Seeckt, the nominal leaders, Hindenburg

and Mackensen, by the weight of their perfect, magnetic personalities, by the esteem in which they were held by their own forces and allies, represented the moral elements; their chiefs of staff, the mathematical elements of strategy. In the happy mixture of these elments, lay the roots of their great success.

The older German military writers regarded the problem of strategy mostly from the point of view of land warfare. Only rarely did they extend their considerations to the influences that the sea and its military missions exerted on strategy as did, for instance, the American, Mahan, in his book, *The Influence of Sea Power upon History*. Today, when Germany also, as the foremost power of the New Europe, must occupy herself no longer with continental but with global policies, no strategist in Germany, either in theory or in practice, can neglect naval strategy. Thus, for example, the command on the eastern front, in all their planning, are obliged to take into consideration the securing of their flanks by naval forces in the Arctic, the Baltic, and the Black Seas and at the same time consider how they make use of their waters as supply routes.

The strategist must feel himself bound by the eternal iron laws of warfare, yet at the same time must follow all the developments of modern weapon technique. He is today, as in the past, lost if he does not throw his whole power into the destruction of the adversary, if both in attack and defense he does not know how to match each thrust with a parry, if he does not follow through logically with his decisions, if he does not make use of his superiority in men and material, if he neglects the advantages of surprise. But he is also lost if he drops behind the times and holds on to old methods of combat, if he does not provide the arms technicians with suggestions for the improvement of old and the creation of new combat material, gained from his own combat experience.

Strategic problems can never be included in a rigid system of instruction. As an organ of military art, strategy will unfold its bloom only under the hand of a creatively gifted man, who, following the leading of his genius and being master of the technical instruments of free artistry, is able to impart a new form to its elements. That is what Moltke meant when he spoke of strategy as a "system of expediencies," when it appeared to him to be "the transference of knowledge to practical life, the development of the original leading thought in accordance with constantly changing conditions, the art of acting under the stress of the hardest of conditions."

Tactics is by no means—as it might appear to be from this hymn of praise in honor of strategy—the lowly antithesis of artistically adorned strategy. Tactics also requires creative power on the part of its devotees. It has a double face, for an eye must be kept on the employment and use of the various arms of the service as well as their cooperation. Tactics—to quote the words of the great King of Prussia—must not regard "details" as of slight consequence, but must always view things as a connected whole. We speak, therefore, of infantry tactics, of artillery tactics, etc.—yes, even of medical and supply tactics, of the tactics of combined arms, of group, platoon, squadron, and aviation group tactics, as well as of battalion, of regiment, and of naval tactics. The noncommissioned officer who directs the machine-gun section and the rifle section of his group in fire and movement in conformity with his schooling is a tactician in exactly the same manner as the divisional commander who gives orders to the artillery commander and the commander of the infantry regiment.

It would be equally as erroneous to regard strategy as the domain of higher military leadership, tactics as that of troop leadership. The strategist must be able to think in a tactical vein; and the tactician, to think and act in a strategic manner. To be sure, the rule is: strategy creates the basic situation for operations, indicates their purpose and objective. A battle without strategic purpose is noise and smoke, the useless, wanton sacrifice of blood and life. Clausewitz' statement is still true today: "Tactics is the doctrine of the use of combat forces in battle and strategy is the doctrine of the use of battles for the purpose of the war." Yet a struggle

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which—innocent of strategic aims—arises from local or personal causes, may—as for example, Spichern, at the beginning of the war of 1870-1871—acquire a strategic purpose. "A tactical victory," Moltke tells us, "is always welcomed by strategy." Yes, even a tactical defeat can, through the brilliant intellect of a true general, become the first link in a chain of strategic victories. Gneisenau's order, on the evening of 16 June 1815, after the defeat at Ligny, which caused the direction of the retreat of the Prussian army to be toward the north instead of toward the east as would have been natural, pointed out the way to the decisive flank thrust on the battlefield of Waterloo-Belle Alliance that became the first spadefull of earth in the digging of Napoleon's grave.

We return to the beginning. As Miltiades, the victor of Marathon, so the general of today must master both strategy and tactics if he wishes to gain the laurels of victory.

The Polish Home Army

From an article in *Polish Facts and Figures* (Polish Government Information Center) 10 August 1944.

ACCORDING to the official declaration of the Polish Ministry of Interior, the decision by the leaders of the political parties concerning the setting up of the Underground Home Army was taken as far back as the siege of Warsaw. In its first stage, this army was joined by Poles of all political groups and all social strata, regardless of creed or race, and had the character of "cadres" whose task it was to prepare for the continuation of the struggle. When it became clear that the war would last for years, reorganization of the forces of the Underground Front took place under the supervision of the Polish Government and of the Chief Command of the Polish Armed Forces in London.

On 1 September 1943 a special decree of President Raczkiewicz announced the principles on which the Home Army was to base its organization. It was to be a uniformed armed force waging war against the occupants. All the armed detachments formed heretofore by various party groups under such names as "Battalions of the Socialist Party," "People's Guard of the Polish Socialist Party," and other nameless formations were consolidated into a single army under one command. The only exceptions were units controlled by communists centered in the Polish Workers Party.

The Chief Commander of the Home Army is appointed by the Commander in Chief. The first two commanders had been killed by the Germans; at present the Army fights under the leadership of a young general using the pseudonym of "Bor." Detachments operating in the territory of the so-called *General Government* (Central Poland) are directly subordinate to him. The command of units operating in the territory of western provinces incorporated into the Reich is in the hands of the senior officers responsible to the Chief Commander.

The Home Army is divided into two groups:

a. Operational Units, used for actual fighting, and

b. Regular Army, which undergoes constant training so that it may be ready when the time comes. The soldiers of the Regular Army are subject to strict military discipline, though they may seem quiet, unconcerned civilians to the occupants.

The Operational Units number 250,000 men, while the number of men in the Regular Army is much higher.

Operational Units live in barracks concealed in deep forests, sometimes even in cities. The soldiers are always on call, fully armed and ready for combat.

The official communiqués of the armed combat command, published in underground papers or broadcast over secret radio sta-

tions, give us a picture of the underground war against Germans in Poland. For obvious reasons it is impossible to give here a full picture of all the acts of sabotage and armed resistance of the Underground. There are many means of combat and sabotage which are still unknown to the Germans. Nor can the results of industrial sabotage be estimated, such as "slowing down" campaigns, etc. Only very few facts have been revealed either by Polish sources or by the German press.

And yet the monthly report of the Home Army's activities for June 1944 is most impressive:

Railway holdups, lasting from three to ninety hours	42
Trains derailed	54
Damaged by sabotage: Locomotives	177
Carriages	956
Railway transports destroyed with incendiary materials	48
Interrupted telegraph communications (lasting 35-70 hours each)	38
Gestapo agents liquidated	379
Armed actions (encounters, attacks on prisons and convoys of prisoners)	71

An interesting instance of the efficiency of the Polish Home Army was given by Raymond Daniell, London correspondent of the *New York Times*, on 6 May 1944:

"Some American sources here [in London] are inclined to regard the exile Government's claims to underground support as somewhat inflated and to question whether it could depend upon the continued loyalty of the Polish people if the Germans were driven from their country and a representative government of their own people was established.

"In this connection an incident that occurred last week is interesting. Certain high Polish officials were telling equally high British officials of the speed and efficiency with which they were able to maintain contact with the Underground. Some skepticism was expressed and the Polish leaders were challenged to prove the point in a practical way. There were certain bridges leading to Lwow, it was said, that for military reasons had to be destroyed. It was suggested that the Polish Government here could demonstrate its influence in occupied Poland by arranging to have those bridges destroyed.

"Orders were issued, and two days before the time limit agreed upon, word came that the bridges had been blown up.

"The news that the bridges had been destroyed was released by British, not Polish, sources."

The activities of the Polish Home Army carried on for over four years have proved essential to the Allied war effort. According to estimates made in January 1944, about nineteen German divisions were tied down in Poland, beside the 350,000 men in special Nazi formations (SS-men, party policemen, railroad guards, etc.).

The Polish underground movement is not confined to Polish territory only. Its activities extend, for instance, to France, where in due time they will bear fruit.

The story of Polish participation would be incomplete without mention of the role which the Polish intelligence service plays in this war against the Germans. Historians who will have access to the records of this branch of the Polish forces will be able to appraise justly the importance of its achievements in the common struggle of the Allies.

Even before the great Soviet offensive rolled into Poland, it had been officially reported that the sabotage actions carried out by the soldiers of the Polish Home Army in the field of land communications greatly weakened the striking power of the German Army on the Russian front. The role the Home Army played was most important because out of four principal railroad lines connecting the Reich with the Russian front, three pass through Poland.

In spite of the severance of diplomatic relations between the Polish and the Soviet Governments, the former instructed its Home Army to cooperate fully with the Red Army in the war against the Germans. Accordingly,

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the Polish units in the Volhynia, Tarnopol, and Stanislawow voivodships (provinces) carried out military operations against the retreating Germans on a scale larger than before. In Lwow—according to a secret radio report from Poland—the Polish units took part in the street fights, aided by the whole population of the city.

The Coldstream at Longstop Hill

An article by Lieutenant Colonel E. R. Hill in *Army Quarterly* (Great Britain) July 1944.

The Ground

TOWARDS the end of December 1942, a battalion of the Coldstream Guards were holding the defensive position at Medjez station about one mile north of the town of that name and looking away northeast down the valley of the River Medjerda. On the left bank of this winding river ran the railway to Tunis and the road to Tebourba, the latter place—made famous by the stand of a battalion of the Hampshire Regiment—being about eighteen miles farther on. The valley was dominated on the right by the Bou feature, later to be captured by a Guards brigade, and on the left, at a distance of about five miles from the station, by Longstop Hill, ultimately to be captured by an infantry brigade. As far as could be seen, and as far as the French maps showed, Longstop Hill was one regular isolated feature some two miles in length and rising to a height of about eight hundred feet, being separated from the higher ground to the west by a low col, and from the high ground to the north by what looked like a basin. One mile southwest of the col was the village of Chassart Teffaha. Between the station, this village, and Longstop Hill the ground was perfectly flat though dotted here and there with small copses and farm buildings. Apart from the main road which ran alongside the railway line, another road branched off left to Chassart Teffaha about one mile east of the station. None of the other roads marked on the map were more than mud tracks and some of them were never located at all.

It will help to explain subsequent events if I say now that the one feature which was not appreciated because it was not known to exist was the Djebel el Rhar which formed a distinct feature at the northeast end of Longstop Hill. Longstop Hill was in fact a double feature, the part that we could see on the ground and which was marked on the map being called Djebel el Ahmera, with Djebel el Rhar separated from it by a deep gully.

Plans

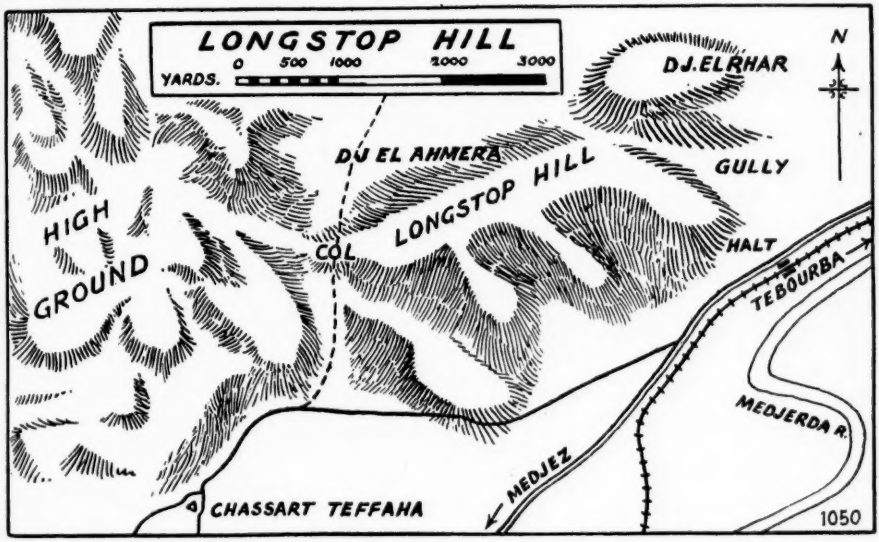
The corps plan was for the Coldstream Guards to seize Longstop Hill during the night of 22-23 December and to hand over before dawn to a battalion of a United States Combat Team. The Guards battalion was then to march back twelve miles to an assembly area southeast of Medjez, so as to be ready to take part in a subsequent phase of the battle for Tunis. Our preliminary contacts with the Americans were most satisfactory. The reconnaissance for the attack was carried out from Grenadier Hill, a dominating feature southeast of Medjez and some seven miles from Longstop. Djebel el Rhar was unfortunately not visible from here or from anywhere else where we could have gone and thus we failed to realize its tactical importance or even its existence.

The battalion plan was for No. 4 Company to seize the col at the west end of Longstop Hill and for No. 1 Company then to pass through and clear the top. Meanwhile No. 2 Company was to attack the known enemy locality at the Halt which was situated just where the railway line passed the east end of Longstop Hill. No. 3 Company was in reserve and was to remain with the battalion command post on the south side of the feature. They moved in rear of No. 2 Company up the main road towards the Halt before

turning off left-handed across country to the foot of the hill.

The First Attack

The attack started off according to plan; there was as yet little moon and a great deal of cloud. One field artillery regiment fired concentrations for twenty minutes on the few known enemy localities and all proceeded satisfactorily. Meanwhile the moon came up and the American battalion due to relieve us began arriving at Medjez station. The plan had been for two of their rifle companies to proceed by Chassart Teffaha and two up the main road towards the Halt. At each place guides had been arranged to lead them on to the positions occupied by our companies, while their battalion headquarters was to follow the right-hand road. When the battalion arrived, however, their commanding officer decided that his battalion headquarters should move with the heavy weapons company on the left-hand road. Despite this change of plan they were confident that this company commander would be capable of linking up the American headquarters with our own which had moved up the right-hand road on which were also our guides for their company. Such a link-up in fact was never made although the American commanding officer himself was persuaded to take the main road going past the Halt. Unfortunately he missed the guides, who were expecting to meet a company and not an individual. Soon afterwards he came under enemy machine-gun fire and was pinned to the ground for several hours. Finally he extricated himself and got in touch with the Coldstream commanding officer at his command post.



Meanwhile the Coldstream attack had apparently gone well. No. 4 Company had occupied the col without opposition. No. 1 Company had cleared the top without suffering undue casualties although the company commander was mortally wounded. No. 2 had seized the Halt, had been strongly counter-attacked and had then lost most of its reserve platoon which, in trying to stabilize the situation, had advanced into an undetected antipersonnel minefield. However, as we appeared to have secured Longstop Hill, possession of the Halt was no longer considered vital and the commanding officer decided not to commit the reserve company to a counter-attack to regain it.

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This was the situation which faced the Americans on their arrival. Their two companies which had come up by the Chassart Teffaha road rapidly took over what both the Coldstream and United States commanding officers thought was the whole of the high ground. The night, though moonlit, was cloudy, and the existence of Djebel el Rhar was still not realized by anyone. This no doubt explains why both commanding officers thought the situation to be well in hand. The American colonel then told the British that he was happy for them to leave him alone on the hill and the order to start withdrawing was accordingly given.

It did not prove possible for the Coldstream to reach their rear assembly area by dawn as had been planned, and it was about 0800 hours on the morning of 23 December before the tail of the last company approached Medjez bridge. Here an attack was made on them by German aircraft which caused no loss. By 1000 hours most of the battalion were having breakfast, having fought all night and marched twelve miles back from the battlefield. The rain, which had previously been intermittent, now started to fall in earnest. Before breakfast had been finished, word suddenly came from brigade headquarters that the Americans on Longstop Hill were in difficulties and that one company with carrier and mortar platoons were to return at once and place themselves under command of the American colonel. By the time they got there it was found that the Americans had been forced off all high ground except at the west end and were now on the lower southern slopes. The Coldstream company was placed in the area of the col, where they had been the previous night.

By mid-day the rain had reduced the roads to such a state as to make it impossible for any wheeled vehicles (other than four-wheel drive of which we had one) to get beyond Chassart Teffaha; even track vehicles could only just get through the mud as far as the col. We had no mules. By the afternoon the commanding officer and another company had been sent for to assist the Americans, and later a third company. The rain continued with unabating fury all that day and night. Early on Christmas Eve the brigade commander made a new plan. The rest of the Coldstream were to return to Longstop, the commanding officer assuming command of all troops on the hill with his second in command to help in coordination.

The Second Attack

The American command post was not easy to find and their interpretation of "liaison" proved to be different from our own in that two enlisted men were detailed for this duty but only knew the location of their company headquarters. They were in fact only the equivalent of our "runners." As was to be expected in such circumstances the situation was obscure. At noon the Americans appeared to be holding on to the southern slopes of Longstop Hill facing north while portions of their excellent heavy weapons company were occupying the top in one or two places somewhere about the middle of the ridge. The fighting portion of the Coldstream battalion was now concentrated at the west end of the hill with a few carriers as no wheeled transport could get beyond the village of Chassart Teffaha about a mile and a half distant. Our plan was to attack again, with No. 4 Company forward, its task being to clear the top of the ridge and dominate the Halt at its eastern extremity; No. 3 Company in support to consolidate on the top, and No. 1 Company to be in reserve. No. 2 Company, sadly depleted since the first attack, was to provide carrying parties. Thus the attack was to be made from west to east with the object of clearing the ridge—for the second time. Zero was at 1700 hours, i.e., two hours before dark.

The attack was successful, but when No. 4 reached the final peak they saw in the failing light what had never previously been appreciated—Djebel el Rhar staring at them across a gully. They thereupon inclined to the left and gallantly attempted to deal with this new objective. It was found, however, to be strongly held and to be a much larger area than one company could possibly cope with. In the darkness the platoons inevitably

lost touch with one another, and with most of the leaders killed, this attack failed and the company withdrew to a position slightly behind the left of No. 1 Company, where they gave some depth to the position. No. 1 were now on the eastern end of Longstop Hill with No. 3 slightly in front and to the right of them.

Soon after this the rain abated and the moon rose to disclose the three forward Coldstream companies struggling to dig in on the eastern slopes of Djebel el Ahmera and overlooked by the Boche who still held Djebel el Rhar. All that night these companies were subjected to accurate German mortar fire which made the task of digging in on almost solid rock extremely difficult for very weary men.

The Night of 24-25 December

The administrative position of the battalion was now far from happy. No wheels could get within 5,000 yards of the forward companies and no vehicles of any sort within 3,000 yards. Ammunition, therefore, had to be brought from Chassart Teffaha to the col by carrier and thence by hand, while the casualties, which were occurring all the time, had to be evacuated by the same painful process. To make things worse, the whole of Longstop Hill was covered by sopping wet knee-high rosemary and coarse heather. It is not, therefore, surprising that by dawn the remains of No. 2 Company who had been carrying these loads were completely exhausted.

Communications too were difficult; rear link to brigade was in the only four-wheeled-drive vehicle there was, which had got up as far as the track at the col; thus a part of battalion headquarters had to be there, as that was also the place where ammunition was transhipped from carriers to men and casualties in turn from stretcher bearers to carriers. Owing to the screening effect of the hills, no wireless set would work from this point to the forward companies and thus the battalion command post had to be located half-way along the top of the ridge where radio speech was possible both to the col and the forward companies.

During the night the "first reinforcements" arrived (the ten percent of its strength which each battalion throws off on going into action; they are sometimes left at the base). They had not been seen since the battalion left England and they were now hurried into the battle with only sufficient pause to dump their big packs. But despite this help, as the night wore on it became apparent that more troops still and considerable artillery support would be necessary to complete the job next day. The only troops available were one company of French native troops with no English-speaking officers and with horsed transport. They were sent up and before dawn were in position on the northern slopes of Longstop Hill. The artillery problem was less satisfactory, as the observation posts had been withdrawn at dark and owing to the state of the tracks were unable to get back till after dawn.

The German Counterattack

By first light on Christmas morning many Coldstream leaders had been killed or wounded. Despite all the carrying parties' efforts, ammunition was short and such three-inch mortars as their detachments had managed to get up had been unable to deal with the German mortars owing to being outranged.

As dawn broke, what was thought at first to be German tanks were seen approaching down the Tebourba road; they swung to the west and disclosed themselves as four eight-wheeled armored cars firing something like a .50 bullet. Without difficulty they were able to maneuver along the north side of Longstop Hill and to shoot up the French company who had not by then been able to dig themselves in and who could not reply effectively with their rifles. Accordingly the native troops withdrew. As the light got stronger it was apparent that a strong force of German infantry had also been brought up and was attacking the Americans on the southern slopes of Longstop Hill from the direction of the Halt and also from the south. They had worked into the thicker country at the foot of the hill before the light got

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strong enough for those on the top to see them. Meanwhile the German mortar and artillery bombardment on the Coldstream and on some of the Americans was intensified and the work of our carrying parties became well-nigh impossible. Casualties continued to mount and ammunition to grow less. By 1000 hours it was clear that Longstop Hill could no longer be held.

Meanwhile a battalion of the Grenadier Guards had been brought up to a position on the high ground between the col and Chassart Teffaha and the Coldstream were ordered to withdraw through them and take up a defensive position west of the village. By the time this position was occupied the battalion was without commanding officer or adjutant, both of whom had been wounded, and with only one officer left out of four in either No. 1 or No. 3 Companies; three company sergeant majors had been killed or wounded and only one of the twelve original platoon sergeants was left. Other junior leaders, both commissioned and noncommissioned, had disappeared in a like ratio. The American survivors, of whom there were tragically few, fought with great courage right until the end, particularly the machine gunners in the heavy weapons company. The Coldstream had lost about 200 men killed or wounded, and the Americans 300.

Conclusion

Thus was fought and lost the battalion's first major engagement since it had helped to hold off the Germans from Dunkirk on 1 June 1940. It is easy to be wise in the light of more recent experience, but at any rate four major lessons were learned from our misfortunes. Firstly, although gunner observation posts may not be able to see in the dark, they must remain with the forward troops throughout the night. Secondly, in hill country it must be realized that if mules cannot be provided, one man in every four may have to carry and so will be lost to the fight. Thirdly, although the British and Americans speak the same language, cooperation on the battalion level in battle is very difficult on account of differences in organization and terminology. Fourthly, it would appear to be asking the impossible of a battalion to order it to carry out an attack and then hand over in the same night. This creates special difficulties for those who are taking over and are expected to remain the next day.

Attacks in Positional Warfare

Translated at the Command and General Staff School from a Russian article by Major A. Gruzdev in *Voyennyi Vestnik* (Military Journal) July 1943.

In positional warfare, the forward edges of the adversaries may often be located some 200 or 300 meters from each other. For this reason, some unit commanders designate the forward edge as the line of departure for the assault of the enemy position. They believe that the camouflaged fortifications of the forward edge not only secure the element of tactical surprise and allow a better utilization of our fire means, but also enable the men to take cover in shelters in the event of enemy artillery attack.

This may prove disastrous, however, if the unit waits too long on the forward edge and fails to approach as close as possible to the enemy during the period of artillery preparation.

This may be caused by the following factors: First of all, men and officers are afraid to approach the line of shell bursts of our artillery. (Experience shows, however, that during artillery preparation our sappers move ahead and clear passages through our own and enemy minefields and obstacles almost without losses from our artillery fire.) Second, the attackers have a tendency to wait until the artillery has destroyed all enemy firing emplacements so that they may cover the distance to the enemy's forward edge and penetrate into his de-

fenses without losses. All this, perhaps, may be due to a lack of training of our troops in the methods of assault, or it may be the result of insufficient preparation of the infantry in overcoming enemy obstacles without the aid of the sappers.

During our artillery preparation the German fire weapons remain silent, and most of their men take cover in shelters. But when artillery fire is transferred into the depth of the defense, the enemy occupies his firing emplacements and opens an intense automatic rifle and machine-gun fire on our approaching infantry. If our units are slow in leaving our forward edge and fail to lay down in front of them a dense barrage of bullets (which, unfortunately, happens quite frequently), the Germans have enough time to occupy their positions, organize machine-gun fire, prevent them from reaching the forward edge, and force them down to the ground.

When the Germans manage to do this, the chances for a successful attack are considerably lowered, particularly if the commanders of the attacking units fail to show any flexibility in control of the battle. It happens quite often that, while enemy machine-gun fires make it impossible for our men to move ahead, our company and battalion commanders hesitate and delay in making a decision. As a result, our men are forced to stay on the ground in the sector where the Germans have firing data prepared for each square meter of the area.

A serious error often made in planning the action of the artillery should also be noted. As a rule, the artillery preparation continues until a certain moment, fixed in advance, when the infantry rushes forward for the assault. At this moment the direct support artillery transfers its fire into the depth. The increase in range is sometimes too great. Furthermore, the artillerymen observe both the enemy firing positions located in depth and the activities of our infantry [exact translation.—Ed.]. Because of this, firing ceases for a period of about one or one and a half minutes and then is resumed, but with a lower intensity. The lack of a definite system in transferring fires and the lowered fire activity of the artillery are often not compensated by the fires of infantry weapons and infantry accompanying guns. This allows the enemy to prepare himself for repelling our attack.

Inversely, when the infantry does not delay on the forward edge but tries to move as close as possible to the enemy defenses following the shell bursts of our artillery (which accompanies the attackers by constant transfers of its fire), the operations of the companies and battalions are successful.

One of our units, for example, was given the mission of capturing a strongly fortified center of resistance. The Germans possessed strong timber and earth pillboxes connected by a system of trenches and passages, and many machine guns located at a distance of from forty to fifty meters from each other, part of them on open platforms. All the approaches were mined and a continuous line of chevaux-de-frise was strung out thirty or forty meters from the forward edge. The terrain was quite open and offered good visibility both from the enemy's forward edge and the depth of his defenses. We did not expect to destroy most of the enemy's firing emplacements by artillery fire, since the pillboxes had overhead covers made of crossties with thick layers of dirt in between. The fire system in the depth of the enemy's defenses was rather weakly developed.

The command of our unit, having considered the errors in the organization of the assault by the unit which had previously attacked, decided to conduct the operation at a rapid tempo. Artillery fires were to support the action until our infantry penetrated into the forward edge of the enemy. To the commanders of the subordinate units and all their men was explained the necessity of getting as close to the enemy as possible (from 100 to 150 meters) during the period of artillery preparation, even though it might involve slight losses from the fire of our artillery. In the event of a standing barrage laid down by German artillery mortars, the infantry was to rush right through it and penetrate into the forward edge of the enemy

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without halting in the neutral zone. During the attack, the riflemen were to fire while advancing.

During the night preceding the attack, preparations were made to blast the German minefields and barbed-wire entanglements, using special explosive charges and electric blasting devices located in our trenches. If these should fail, the passages were to be made by sappers, two groups of which were attached to each company. The sappers were equipped with wire-cutters and grapling irons. Infantrymen carried grenade bundles. Preliminary exercises had shown that a grenade bundle, when thrown skilfully, makes a satisfactory passage in the enemy barbed-wire entanglements. This equipment, however, was not used. With the first shell of our artillery preparation, the German obstacles were blown up and passages cleared for our infantry.

In planning the advance, the commander of the unit and his staff had anticipated a series of measures for securing the success of the attack. A minute before the direct support artillery opened fire, a powerful fire attack of our machine guns, automatic weapons, and rifles was carried out in order to hit enemy observers and men on the forward edge and in the nearest depth of enemy defenses.

During the artillery preparation our infantry moved forward, crawling toward the enemy forward edge. With the transfer of artillery fire into the depth of the defense and to the flanks, our 82-mm and 50-mm mortars began firing. They were located from 250 to 300 meters from the forward edge of the enemy. This made it possible for their crews to observe the effect of their fires and the advance of the rifle companies, and to deliver effective fire on the forward edge. This enabled our men to move within assaulting distance of the enemy position. Separate guns and heavy machine guns located in open positions and with firing data prepared in advance conducted fire at the embrasures of the pillboxes.

The Germans, pressed to the ground, did not notice the transfer of our artillery fire (the increase in range was small). When our infantry broke into the forward edge, the Germans were still lying on the bottom of their trenches or in the corners of the pillboxes. Before they opened fire, they were showered with a hail of hand grenades. It should be noted that even during the hand-to-hand combat in the depth of the center of resistance, the Germans refrained for a long time from opening artillery and mortar fire. Apparently, the German officers, deprived of all means of communication and control of their units, were afraid of hitting their own men.

Thanks to the thorough preparation of the attack and to its rapid execution, the enemy center of resistance was captured almost without losses on our part.

Conclusions

1. When the hostile forward edge is within a few hundred yards of ours, it is necessary that rifle companies and battalions approach the enemy as close as possible before launching the assault. The assault should be carried out rapidly and boldly. Halts of the attacking infantry in the neutral zone should not be allowed.

2. Infantry units should be instructed not to halt on terrain lines subjected to adjusted enemy fire, but to advance as quickly as possible. This also holds true for enemy minefields and barbed-wire entanglements. In order to clear passages through the obstacles, special explosive charges in addition to artillery and mortars, as well as sapper groups supplied with the necessary equipment, should be used. Besides, infantry units should be instructed how to overcome obstacles without the assistance of sapper groups. In order to make passages through timber and earth fences built by the Germans in wooded areas, it is advisable to use blasting devices, inasmuch as the effectiveness of artillery firing from concealed positions is in this case rather low.

3. In planning an artillery attack, it is necessary to reduce to a minimum the time interval between the transfer of fire to the

depth of enemy defenses and the moment when the infantry reaches the forward edge of the enemy position. The increase in range should be rather small. During the transfer of direct support artillery fire into the depth of enemy defenses, care should be taken to intensify the fires of infantry accompanying artillery, mortars, and machine guns.

4. It is advisable to advance battalion and company mortars to positions offering good visibility of our battle formations and permitting control of fire without the aid of technical means of communication.

And finally, commanders of all ranks should require that all riflemen, submachine gunners, and machine gunners fire during the attack. It is obvious that this will not be aimed fire. It will be directed toward points and lines probably occupied by the enemy. Nevertheless, such firing by all types of infantry weapons can disorganize the enemy and keep him pinned to the ground.

Elastic Defense

Translated at the Command and General Staff School from a German article by Major General Dihle in *Hamburger Fremdenblatt* 14 June 1944.

THE forms of defense have undergone many changes in the course of time. Combat regulations formerly provided for but one line of defense with which to oppose an attacking enemy. If, in the face of superior force, this could not be held in spite of all efforts, the only alternative, if the forces were not to be wiped out, was to retreat and attempt to offer resistance again in a "delaying position." This delaying position, in order to afford a hold for the retreating forces and provide them with fire protection, was occupied by reserves that had been held back or by troops that had been pulled out of battle.

The offensive idea was introduced into defense at an early period. It was intrusted to only a part of the available forces, against whose defense line the enemy was to be induced to deploy his forces. The main body of one's own forces, however, were left available for an attack on the flanks or rear of the enemy who had been thus tied up. This required, to be sure, that the defense be strong enough to avoid being overrun, that there should be enough room on the flanks to assure freedom of movement to the forces intended for the offensive, and that the enemy should fall into the trap that had been set for him.

As a rule, however, attack was preferred to defense, although Clausewitz has designated the latter as "a more powerful manner of conducting operations." In addition, the spade-work necessary for the reinforcement of the ground in defense enjoyed no great favor. Later on, its value was to be more appreciated. The delaying position, which was often occupied only after a critical situation had arisen, and therefore frequently too late, quite often did not fulfil its purpose. The holding or not holding of one's defense line meant victory or defeat.

In the war of 1914-1918, after the battle lines had become fixed in trench warfare, it was shown that this form of defense possessed many defects. The defense itself had become absolute, for with the long, continuous lines stretching from the sea to the Swiss border, freedom of movement on any wing was out of the question and as a result the association of defense with attack in the above described manner was not possible. A frontal attack carried out with adequate forces was able to break through the enemy's lines, veer toward the wings which at the point of the breakthrough were unprotected, and in this manner roll up the defense line. This sealed the fate of the defender, if it were not possible to bring up reserves quickly and halt further advance of the attacker. Besides, it had been shown that, because of the increased effect of modern artillery, such heavy losses occurred in strongly occupied lines that the possibility of defense became a matter of uncertainty.

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In order to eliminate these undesirable conditions, the establishment of a "defense zone" was decided on. It embraced a deep strip of ground both in front of and to the rear of the main line of defense. In this zone, the foremost line against which it was to be expected that the enemy artillery would mainly direct its preparation fire was occupied as weakly as was practicable (it being able, as a matter of fact, to ward off a surprise attack). Thus the occurence of heavy losses was avoided. The main defense forces were echeloned in depth. The attacker was, in this way, compelled to carry his attack through a deep zone in which he had to count on offensive thrusts against the advanced units of his forces. At times he was also obliged to bring his artillery farther forward if he cared to continue an effective support of the attack. Even this type of defense can be designated as elastic, for as a rule the forces in advance of the main line of defense received orders to yield to an attack by superior forces. On the other hand, as a result of deep echelonment of his forces, the defender was in a position to unleash an attack on his part against the enemy who had penetrated his position.

In the present war, elastic defense has assumed still other forms. They result from the fact that, with the enormous extent of the total fighting front and the nature of the terrain, neither defense nor attack fronts are wholly occupied and continuous, but exhibit unoccupied gaps of greater or lesser extent. The attacker is afforded the opportunity, consequently, of filtering through zones not occupied by the defender and of reaching the flanks or rear of the defense. The execution of such operations is rendered easier by the high degree of mobility of tanks and motorized forces. This exposes the defender to the danger of being unexpectedly attacked in his flanks or rear at times when reconnaissance is hindered by snow, storm, fog, etc.

If, in such a case, he does not succeed in beating the attacker, then he is faced with the alternatives of being encircled or, if possible, of evacuating the position promptly and breaking away from the attacker. The latter measure does not signify any definite defeat. It may form a part of previously conceived plans which may call for rapidly bringing up mobile reinforcements, for hurling the enemy back to his line of departure and winning back the old position, or for cutting off the enemy.

Elastic defense consists, therefore, in the relinquishment—under certain circumstances and for the time being only—of positions that have become untenable in order to avoid useless sacrifice of men and equipment, and in hurling the enemy back by keeping an eye open for a situation that will favor such an offensive operation. It is not absolutely necessary that this alternation of defense and attack occur in one and the same front position. The defender may, for example, yield ground in one place, while offensive thrusts successfully executed on an adjoining sector compel the enemy to give up his gains. Also it may happen that, as a result of an unsuccessful development in a neighboring sector, it becomes necessary to draw one's own positions back either to obtain more favorable defense conditions or to create the opportunity for beginning an offensive.

The alternations of defense, withdrawal, and attack offer many advantages. Unnecessary losses are avoided, and more favorable conditions for defense and attack are obtained. Thus, the enemy sees himself faced with situations that he is not able to take into account beforehand. Great flexibility is required on the part of both command and troops in conducting operations in this manner—clear decisions, quick adaptation to new situations, and a considerable amount of exertion. It is, however, applicable only in those cases where the troops have complete faith in their leaders and a firm grasp of themselves, where they do not lose their composure, no matter what the situation. If these requirements are lacking, then this type of strategy can lead to moral perturbation and demoralization. In the case of the German troops, however, we have nothing to fear in this respect.

Observations Concerning the German V-1 Winged Bomb

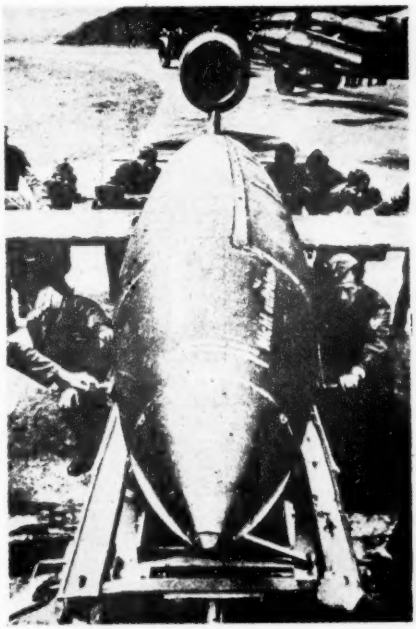
Translated at the Command and General Staff School from a German article by Alfred Stettbacher in *Neue Zürcher Zeitung* (Zürich, Switzerland) 28 June 1944.

CONCERNING the composition of the explosive charges carried by the "robot planes," accurate information has been lacking up to the present time in spite of the fact that already several of these craft have dropped intact on English soil and have been studied.

Except for their blinding brilliance, dangerous blast wave, and the enormous heat generated, nothing further has been made known about the charges used, except for the English comparison with the explosive effect of a German 1000-kilogram bomb and the official announcement on the part of the Germans of the employment of a new explosive missile of heaviest caliber. Assuredly, we are dealing here with one of the most explosive and powerful compositions.

As secondary phenomena, it is further reported by eye witnesses that innumerable missiles which have fallen over wide areas of southern England have accompanied the enormous flash of the explosion. There is no doubt that these are not ballistically directed projectiles, but fragments or, at the most, projectiles which are mixed with the charge and which are hurled in all directions by the explosion, thus extending the deadly effects far beyond the zone of the explosion wave.

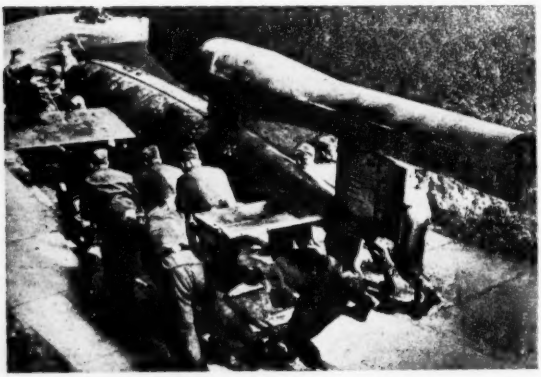
A maximum speed of 640 kilometers per hour observed up to the present time is still surpassed by the fastest pursuit planes. According to the details recently published by the British Air Ministry along with a sectional drawing, 640 liters (490 kilograms) of gasoline are employed as a propellant which, in burning, requires no less than 1,730 kilograms (1.54 cubic meters) of liquid oxygen. With a range of 160 kilometers, 640/900 = 0.71 liters (530 grams) of gasoline with 1.72 liters of liquid oxygen would have to be consumed every second. If roughly correct, these figures give an idea of the enormous intensity of the light effect at the exhaust nozzle at the tail end. The employment of compressed oxygen appears improbable, as the weight of the pressure tank for more than 1200 cubic meters of oxygen would be too great. The two main difficulties of such a rocket drive should lie in the limited time accorded for the combustion of such quantities of fuel and the maintenance of such intense heat below the fuzing point of the metal nozzles. It is obvious that the situation in the case of the flying bomb is much more complicated than with the similarly propelled and controlled torpedo, with its mere ten kilometer—hence twenty times lesser—range. No wonder that the crewless weapon almost failed to emerge from the experimental stage.



THE V-1 WINGED BOMB. (From *Hamburger Fremdenblatt*, Hamburg, Germany.)

Without any question, the German robot "V-1" with automatic pilot and rocket drive

represents the most surprising accomplishment in the scientific aspect of warfare up to the present time. Like the ballistic miracle of the long-range cannon whose meteor-like projectiles fell on Paris, the winged bomb, this remarkable hybrid between shell and bomb, has made a great leap in extending artillery (not aviation) ranges. According to information thus far received, the problem of the transportation of explosives through the air for distances up to 200 kilometers has already been solved, and the announcement of additional "V" weapons with still greater explosive charges and ranges sounds quite plausible. But the flying bombs are still aircraft that can be combated with pursuit planes, and whose launching installations likewise are subject to attacks by aviation.



"FROM A WELL COVERED POSITION, V-1 IS ROLLED TO THE LAUNCHING PLATFORM. THE TAKE-OFF IS EFFECTED BY MEANS OF A COMPRESSED-AIR MECHANISM." (From *Hamburger Fremdenblatt.*)

The next goal continues, therefore, to be the actual rocket projectile bomb (in the *Neue Zürcher Zeitung* of 26 June 1944, it was mentioned that on the Cotentin Peninsula medium-heavy rocket projectiles had been found which differed essentially from the winged bombs) which, provided with small stabilizing fins and proof against all attack by aviation as a result of its projectile-like speed, roars down onto the target area. Such a rocket bomb would have to be catapulted from subterranean tunnels into the air, where within a fraction of a minute it would reach projectile speed and then, with its tail-fire dying away, would plunge down unseen onto the predetermined area. To be sure, accuracy is also wanting here, but since the projectiles can be smaller and simpler in construction, and can be fired in correspondingly greater numbers for the purpose of keeping wide areas under harassing fire and for driving the population under ground, their design will constitute the promising goal of coming military science. From the present temporary attacks by aviation with limited areas of alarm, continuous bombardment could be developed that would jeopardize life over wide areas and render any orderly activity on the surface impossible. Also, there is but one successful defense against this weapon, and that is, as in the case of the "V-1," to seize the bombproof launching installations.

Street Fighting—Tips from a Platoon Commander in Italy

From a British source.

EVERY street is a death trap. (If you've heard this before, it doesn't matter. It's one of those tags that bears endless repetition.) Why? Because it's where the Hun expects you and waits for you. And it's the place where you kill him. But to get to it, move always by the back yards, over the roofs, or by blowing your way through the walls. You've got to be wonderfully nippy. You're carrying your weapons, and all the time you're clambering up walls, climbing up drain pipes, scrambling over roofs, and

(like the seagull) dropping from considerable heights.

Remember that there'll probably be no Arty support, or precious little. It may be possible to run up a 25-pounder, loose it off, and run it back into cover again. I'm told this has been done. The Germans certainly used their infantry guns in T—. But there's an ideal use for almost every one of the battalion's weapons; rifle for sniping, and LMG [light machine gun] for driving enemy movements under cover; TSMG [Thompson submachine gun] for clearing rooms and passages; 36 grenade for promiscuous killing and breaking up parties in rooms and cellars, 68 grenade for firing into windows from 100 yds or so, 69 grenade for temporarily stunning, and ST grenade for slapping on barricaded doors; 2-in mortar for quick smoke, and 3-in for flushing enemy from cover and for spoiling barricades and road blocks; PIAT for breaking open walls and loopholes; 6-pounder for knocking down strong points and pillboxes; 20-mm (if you've got them with you) for pumping shells into top story windows; and Guinness for strength—you'll need it! (I'm absolutely serious about this question of fitness. Perhaps I felt it more than I should if I had not lately come out of the hospital. But street fighting is a hell of a strenuous business. This party took it out of the fittest of us.)

Before we started on the job, our Intelligence Officer managed to get hold of a local guide book which had a little information in it about T—, and a photograph of the church. But much more useful were some low obliques which the air produced for us. These gave an excellent idea of the layout of the town, the width of the streets, and the types of buildings. As in every other kind of fighting, you want to find out beforehand as much as you possibly can about the battleground.

The technique you must develop is quite unlike any other. Covered approaches, fire positions, forming-up places, etc., are no longer hollows, hills, hedges, and ditches, but walls, doors, windows, stairs, and roofs. The whole thing relies tremendously on the initiative of platoon and section commanders, for it is a platoon and section battle. Not only the likes of you and me and our NCO's, but *every individual man* has got to know what to do without being told. It's the fifty-seventh variety of football team. The captain doesn't have to tell the goalkeeper to stop the ball, or the halves to back up the forwards in attack. Which may be trite, but it's not a bad way of putting it across. It means, of course, that you've got to have a drill for pretty well everything—for a section busting into a house; for a platoon advancing by way of roofs and backyards; and so on. Once you get these tied up, a section commander always knows that his LMG is on a roof covering his advance, his grenade man is following him, Nos. 3 and 4 are holding the stairs and landing, etc.

There's one thing about the Boche you can rely on; his astonishing consistency. He's a four-lettered man with a one track mind; and they're the same four letters whether he's busy "improving" a minefield or rigging up natty contraptions in buildings. But there are two big points of difference about his booby traps in minefields and in buildings. The first is that in buildings you don't *have* to investigate every comic-looking contrivance you come across, as you must when you're picking your way through a minefield. The second is that a town or village in which every house is held is not likely to be booby trapped. It is the houses and villages he has evacuated that friend Boche is so fond of plastering with souvenirs. At T— you could have drawn a line from east to west roughly through the center of the town. South of it, bags of booby traps; north of it, sweet nothing. The answer was that he was only holding the northern half of the place. So precautions are really quite simple. Watch for wire (as always), and *don't muck about.* Don't open drawers, switch on lights, pull plugs or lift up odd tins of M and V [meat and vegetables]. Your job is to find the enemy and kill him. If he is not in a room, go away and leave it. If you muck about, you'll kill yourself and the unfortunates with you.

Darkness is a good friend to burglars and gangsters, and therefore to you. Get your

chaps used to moving over difficult going in the dark—and get used to it yourself. It's not easy, but it saves lives and ammunition. Ammunition expenditure is liable to be heavy, especially machine carbines and grenades. You've got to watch this. You and everyone else, every single man, must *count the rounds*. If you don't, you'll be caught with your trousers down and an empty Tommy gun and no grenades.

Combat in Inhabited Places

Translated and digested at the Command and General Staff School from an article by Captain Retsser in *Ejercito* (Spain) January 1944. Originally published in *La Revue Militaire Suisse*.

Although this article contains a number of questionable statements, which is probably a result of two or three successive translations of the original paper, it presents a novel, original, and somewhat different treatment of the subject.
—THE EDITOR.

BEFORE beginning the examination of combat in inhabited places, let us set down a few general concepts:

1. In the street, field of fire of all weapons coincides with the routes the vehicles have to follow. The houses permit of covered advance and may be transformed into fortifications.

2. The principle "See far off, but command close up" is applied rigorously.

3. Combat is carried on in three-dimensional space, which materially complicates the exercise of command.

4. Final victory is equal to the sum of the individual victories.

The attacking side possesses the advantage of being able to fix the hour and the place of attack. The defender, on the other hand, can choose the points he desires to hold, although the advent of the tank and airplane has caused him to forego the selection of good fields of fire in favor of locations where he is able, at least partially, to eliminate the menace of these new means of combat.

Attack

The purpose of the attack is the annihilation of the enemy forces and the occupation of the center of resistance constituted by the village. When the village possesses extensions, it is divided into sectors, each of which constitutes a closed strongpoint. It is necessary, therefore, to form wedges, to break up the inhabited place as a whole, and to isolate the different strongpoints.

Two phases are to be distinguished:

1. The approach and occupation of the outskirts of the inhabited place.

2. Penetration in the form of a wedge, or combat in the inhabited place.

During the first phase one must have a strong fire support of all heavy weapons. This phase of fighting is a flexible combination of fire and movement from the base of the attack, represented in this case by the outskirts of the place. Counterattacks by tanks are more to be feared than the intervention of aviation and harassing fire. Consequently, unless the operation is carried out at night, this phase cannot be considered as a combat of infantry against infantry.

The second phase requires extremely careful preparation. Nothing must be neglected in the examination of the situation, for it is not a matter of a furious assault but of an attack in which covering fire takes the place of support fire.

Due to the numerous imponderable factors and risks accompanying such attacks, it is necessary that every man engaged, whether he be a commander or individual combatant, know his mission perfectly and the course he is to pursue once that mission is accomplished.

We may assume that the data relative to the enemy, his forces, his equipment, his dispositions, and his plan of defense are

rarely accurate and complete, for it is not at all easy to obtain this information, neither the employment of armored reconnaissance vehicles nor planes sufficing. The elements of the attacking force which are in contact with the enemy have little to fear from hostile aviation or artillery.

The terrain, divided both in a horizontal and vertical sense, should be examined in the light of what is known of the enemy. It is divided up into districts which in turn are divided into blocks of houses by avenues and streets, said blocks frequently broken up by interior yards and private drives. A compartment of the terrain will, therefore, be formed by a group of buildings between adjacent streets. The fronts of the buildings facing the streets and their roofs fix the limits of the three-dimensional division. Going out into the street or going up onto a roof is to expose one's self to fire from adjoining sections. Consequently, the advance is from house to house and is very slow. The axis of attack is intersected by numerous intermediary objectives, each of which requires a new examination and new orders.

The means employed depend on the terrain and the enemy. One should not only make an inventory of what one has but know what must be employed, and this will result, possibly, in the shifting of units and of equipment.

Covering fires delivered by the infantry weapons supplement supporting fires and permit of movement in the open. The mortar displays here its great value. The same is true of the infantry cannon which is more easily handled than the 75-mm gun for firing at embrasures. As an antitank weapon its task is rendered easier by the fact that the streets string out the tank attack, forcing them to advance with excessive depth of formation. The heavy machine gun is rather difficult to handle. It may be used for protective line fires covering the flanks of the advance. The infantry soldier must put all he has into the execution of his task. He bores in, penetrates, annihilates, and destroys, making constant use of all the weapons suitable for close-range combat, such as flame thrower, submachine gun, bayonet, hand grenade, and pistol.

The employment of such means requires simple, clear, and precise maneuver, understood by every one. It is necessary to coordinate and synchronize the action in order not to expose one's own troops to danger unnecessarily. The commander, whatever be his rank, is at the same time author and stage director. He must live the action before commanding it and directing its execution. The difficulties in the way of maintaining contact oblige him to be everywhere. The ground that has been taken must be organized and held.

The term "Enemy No. 1" belongs to the airplane. All the evil comes from this, for it sees, observes, bombs, attacks with cannon and machine gun, and directs and adjusts the fire of the artillery. The bombers come, leave, and return in the midst of a deafening din that has its effect on the nerves and morale of the defenders. Their bombs destroy entire buildings and districts. Their delayed-action bombs undermine and bring down obstacles. Then "Enemy No. 2"—the tank—appears. Taking advantage of the wreckage, guided by the airplane with which it has radio contact, it advances like a reptile, completing on the horizontal plane the work of the aviation. But neither the tank nor the plane can occupy the ground; they only prepare and create the approaches required by the infantryman. The latter, advancing under cover or by way of defiladed approaches leading to the place, makes use of the support of the fire of aviation and tanks to approach his objective and set foot on it. Assisted by tanks and assault guns, he penetrates then into the defense area in order to annihilate whatever still shows signs of life there. He crushes resistance and breaks up the defense system.

Defense

When it is not possible to remain on the surface, the infantryman hides himself in the bowels of the earth. To protect one's self against the bomb and artillery projectile, it is necessary to construct secure and gas-proof shelters. Immediately after this, as large a number of antitank obstacles as possible

should be constructed. The infantry cannon, the antitank rifle, and the flame thrower serve to destroy the tanks. The mortar lays its fire down over the avenues of approach to the place and supports the counterattacks. Located in the outskirts of the inhabited place, the machine gun opposes advances on the village, does what it can to prevent reconnaissance and enemy attacks, maintains a watch over the minefields, and provides fire contact between the different centers of resistance through the medium of enfilade fire. The infantryman, with all his close-range combat weapons, observes. He is in reserve, ready for a counterattack, prepared for hand-to-hand fighting. Amidst the ruins, he fights with equal weapons against his specific enemy—the infantryman opposing him—without fear any longer of either the plane or the tank.

We must examine the terrain in its relation to the enemy and his equipment. The defense of an inhabited place absorbs many men. One must not hesitate, therefore, to destroy or blow up all that cannot be held, without omitting objectives of negative value. Structures of sufficient resistance will be transformed into fortifications or shelters. The approaches for the reserves must be prepared.

The plan of defense, which is in this case the counterpart of the plan of maneuver in offense, is a combination of the fire plan and the employment of the reserves.

It is almost evident that a lineal disposition of the secondary strongpoints would complicate the exercise of command and would render impossible the intervention of the reserves. Without including in it the outskirts of the place, one may, without fear, give the center of resistance the greatest extension possible because of the danger from the air. One should bear in mind that excess, in this respect, may impair the cohesion of the whole, complicate to too great a degree the matter of antitank defense, and absorb a great deal of personnel. An external belt of obstacles does not suffice; if it is finally passed, even though it be at a single point, the tanks would break into the place and, running in a wild course through the streets, would produce enormous confusion in the forces of the defense. The said belt must possess its complement in the form of numerous interior obstacles constituting a veritable labyrinth, owing to which it will be extremely difficult to recognize the main portion of the defense system. Antitank weapons are located to supplement the external obstacles, while detachments skilled in close combat are used in connection with the obstacles in the interior.

The infantry must transform into fortifications all buildings capable of offering at least partial resistance to bombing and shelling. Everything that is not occupied must be destroyed or sown with mines. There must not be a rigid fire plan: it should be based on mobile weapons. It is necessary to be on the alert and work rapidly. In all echelons, the weaker the means, the stronger must be the reserves.

In defense, the idea of surviving bombing and shelling should predominate, preserving intact weapons and ammunition.

Combat in an inhabited place is difficult to conduct. It should be studied on the spot in spite of the difficulties which such study may entail. It is a real test of ability and merits being accorded a larger place in our programs of instruction for cadres.

It is much easier to put a grenade into a room first and then look, than to look first to see if one is needed.

—*Aim* (Army magazine of Middle East Command).

Planning of Fires of Direct Support Artillery Groups

Translated and digested at the Command and General Staff School from a Russian article by Colonel G. I. Maslov in *Artilleriiskii Zhurnal* (Artillery Journal) October 1943.

There are three direct support artillery groups in Soviet infantry divisions. Each group supports an infantry regiment and is made up of two or more (depending upon the mission) battalions of division artillery. These groups may be reinforced by units of corps or army artillery.—THE EDITOR.

In offensive operations, the fires of the direct support artillery groups are planned for the three phases of the battle: preparation of attack, support of attack, and support of infantry and tank operations in the depth of enemy defenses.

The following documents should be prepared by the staff of the group:

1. A map showing reconnaissance information of the enemy, battle formation of the group, fire missions assigned by the division artillery commander and by the commander of the supported infantry regiment.

2. Reconnaissance overlays of the group and of its battalions, extracts from the journal of targets, combat reports about enemy reconnaissance, aerial photos.

When large-scale maps are not available, an enlarged overlay, 1:25,000, should be prepared. In addition to main observation posts, targets and the disposition of fire means of the group are plotted by coordinates as accurately as possible. This map is one of the most important documents of the chief of staff. The map should be kept up to date by the assistant chief of staff. If there is not sufficient time for preparing a separate map, the assistant chief of staff may use his work map for this purpose.

Fire Missions

The commander of the group plans his fires according to the missions assigned by the division artillery commander and by the commander of the supported infantry regiment. The fire missions of the division artillery commander should anticipate:

1. Destruction of separate structures and the neutralization or destruction of targets that may interfere with the success of the attack of the division as a whole;

2. Security of the regimental boundaries and flanks;

3. Fires for repelling enemy counterattacks during the attack and the battle in the depth of enemy defenses.

In assigning missions the division artillery commander indicates:

For the period of preparation of the attack:

a. Time and methods of registration fires and fire control;

b. Time allotted for artillery preparation, fire missions, periods of firing, and false transfers of fires;

c. Number of guns for direct fires and targets;

d. Fire reserve of the division artillery commander [probably means in general support];

e. Expenditure of ammunition for this period.

For the period of support of the attack:

a. Sectors of infantry regiments where support of the attack is to be organized and methods of firing (moving barrage or successive concentrations);

b. General outline of phase lines for fires;

c. Reinforcement of the direct support artillery groups by artillery and mortar battalions of the army group and sectors of their fires;

d. Fires for securing regimental and division boundaries and flanks;

e. Number of guns for direct support of the infantry;

f. Expenditure of ammunition for the planned period;

g. Visual and radio signals for fire control;

h. Order of displacement of artillery units.

For the period of support of infantry and tank operations in the depth of enemy defenses:

a. Location of enemy reserves, their most probable deployment, and directions of their counterattacks;

b. Missions for standing barrages and concentrations for repelling counterattacks;

c. Expenditure of ammunition;

d. Time for placing the artillery and mortars of the group under the commander of the supported infantry regiment as the battle develops in the depth.

When the division is reinforced by tanks for supporting the infantry attack, the commander of the division artillery indicates:

a. Combat formation of tanks and their missions;

b. Battalions of the group which will support the tanks;

c. Method of fire for supporting the tanks and sectors and lines of fire;

d. How to establish cooperation with the tanks;

e. Number of guns detailed by the group for tank support;

f. Organization of observation of tank operations, and visual and radio signals for the purpose of cooperation.

The commander of the artillery group, upon receipt of the order from the division artillery commander, calls on the commander of the infantry regiment and discusses with him the following:

a. Code symbols for terrain features and reference points established by the division artillery commander;

b. Composition and battle formation of the group;

c. Missions of the division artillery commander;

d. Fire reserve of the division artillery commander;

e. Available ammunition and time allotted for the completion of missions of the commander of the infantry regiment and of the battalion commanders;

f. Time the group is ready to open fire;

g. Observation post and command post of the group.

The commander of the infantry regiment informs the commander of the group of the following:

a. Supplementary code for terrain features and reference points;

b. Mission of the regiment and his decision;

c. Objectives of the units of the regiment during the attack;

d. Routes and order of arrival of the battalions at the area of departure;

e. Line of departure; time of its occupation and the beginning of the attack, and tentative time of reaching the assault line;

f. Missions of the infantry regimental artillery and mortars during various stages of the battle.

As to the tanks supporting the regiment, the following information is supplied by the regimental commander:

a. Distribution of tanks among the battalions;

b. Departure position of tanks, time this position is to be occupied, battle formation of tanks;

c. Routes and objectives of tanks during the battle;

d. Intermediate and final assembly areas.

The regimental commander in assigning missions to the group indicates:

a. Artillery battalions and mortars of the group for the support of infantry battalions;

b. Supplementary fire missions for the period of artillery preparation, support of infantry action from the line of departure to the assault line;

c. Missions pertaining to the support of the attack in the depth, phase lines for fires and missions;

d. Temporary attachment of the artillery battalions and mortars of the group to other units as battle develops in the depth;

e. Signals for attack and for assault, similar signals for tanks, signals for fire transfers on subsequent phase lines during the support of the attack and the battle in the depth, and

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areas from which these signals are to be given;

f. Methods of communication and target indication for infantry, artillery, and tanks;

g. Command post and observation post of the regimental commander.

The commander of the group informs the commander of the regiment whether or not all assigned missions can be accomplished. If all missions cannot be accomplished, the regimental commander should indicate the priority in their accomplishment. The missions assigned by the division artillery commanders are, as a rule, accomplished first.

Planning of Artillery Preparation

If the attack is to begin in twenty-four hours or more, the division artillery commander, under the direction of the army artillery commander, prepares plans for artillery fires for each of the twenty-four-hour periods preceding the attack. The commanders of direct support artillery groups prepare similar plans for their units. Fires planned for these periods are intended to destroy or neutralize only definitely identified targets.

Registration fires are conducted shortly before artillery preparation begins. The commander of the group should, according to the directives of the division artillery commander, work out a plan for registration fires, which are conducted only by part of the batteries or by separate guns.

Artillery preparation is planned for two periods: destruction and neutralization of separate targets, and neutralization of areas composed of several targets.

Precision fires for the destruction of particularly solid installations in the enemy defenses are conducted first, because of the fact that smoke and dust produced by shell bursts of neutralization fires make it impossible to fire at separate targets.

Nevertheless, the period of destruction fires does not always precede neutralization fires. When, for example, there is only a limited number of areas to be neutralized and these areas are located in the depth of the tactical defense, and if separate targets can be observed during neutralization fires, then both types of fires can be conducted simultaneously. Some separate targets may be destroyed during registration fires.

Concentrations may be used for a number of separate targets located close to each other. The same holds true for unobserved fires. Concentration fires are also used at night and whenever firing at separate targets is impossible because of poor observation.

All guns engaged in direct firing are used simultaneously and go into action when the enemy fires have been sufficiently disrupted by our fires. Direct fires are usually conducted simultaneously with the destruction of separate targets by indirect fires.

In planning artillery preparation, it is very important to pay particular attention to the period of time during which the infantry moves from the line of departure to the assault line. During this period the artillery should neutralize all enemy fire means which are likely to affect the battle formations of the attacking forces.

All fire missions should be studied on the ground by the commanders planning artillery preparation.

Support of the infantry in the attack zone, when observation from the ground observation posts is possible, is accomplished by moving barrages or concentration fires, or combination of both. This depends upon reconnaissance data and availability of fire means and ammunition. The depth of the fire zone for the support of the attack is determined by the visibility from ground observation posts, and equals, in most cases, the depth of the enemy battalion defense area (approximately from 1.5 to 2.0 kilometers).

The planning of fires to be delivered in the depth of enemy defenses is intended to insure the participation of the artillery battalions in repelling the counterattacks by the reserves and to destroy fire means and manpower of the enemy.

When reconnaissance data for the depth of the enemy defenses are lacking, the phase lines (sectors) for fires are designated on the basis of an assumed disposition of enemy battle formations, determined by the study of the

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terrain on the map. Fires are planned for the depth of the mission of the supported regiment and are conducted when observation is possible and when active targets are observed.

As the battle develops, part of the artillery and mortars of the group are placed under the commander of the infantry regiment. This should be specified in the plan. One or two battalions (preferably heavy and howitzer batteries) should remain under the commander of the group. These are used for supplementary missions of the commander of the infantry regiment and of the division artillery commander.

Planning of Support of the Attack and of Battle in the Depth

Missions assigned by the division artillery commander for the support of the attack and of the battle in the depth are plotted by the commander of the group on his work map and are later checked on the ground during a joint reconnaissance with the commander of the supported infantry regiment and the commander of the tank unit.

Sectors (targets, areas for fires) for barrages and concentrations are also marked on the map for each of the artillery battalions. Then code names for phase lines, methods of target reporting, and signals for fire transfers on successive phase lines and areas are worked out.

If time is available, the staff of the group first distributes among the commanders of the artillery battalions a tentative plan of the support of the attack and of the battle in the depth. The commanders of the artillery battalions, together with the commanders of the supported infantry battalions and the commanders of the attached tank units, study their missions on the ground. The resulting, more detailed plans are sent back to the staff. The staff summarizes all these plans and then proceeds as described above.

When time is available, the staff of the group prepares a firing chart containing all information pertaining to fires during the attack. In doing so, the staff should be guided by the following considerations:

1. Missions assigned by the division artillery commander and by the commander of the supported regiment are attended to first;

2. Destruction of separate targets should be completed during the assigned time; the distribution of targets among the units and the sequence of firing should not interfere with observation and adjustment of fire on these targets;

3. Targets or areas not subjected to fires for fifteen or twenty minutes should be fired upon periodically;

4. Artillery preparation should begin with an intense fire by all guns and mortars. This is done to achieve the maximum possible effect and to exploit the element of surprise;

5. Fires are transferred into the depth of the defenses only after a check of the readiness of the infantry or tanks to launch the assault.

The following information is recorded in the firing chart in the column "Battle in Depth": sequence of seizure by the infantry or tanks of terrain lines (phase lines); missions of artillery battalions (targets, areas, areas for possible fires) for the support of the attack on successive lines; type of barrages and concentrations when and where battalions are placed under the commander of the supported unit.

The principal document for this period is an overlay graphically representing all fires during the attack and the battle in the depth of enemy defense. This is prepared by the chief of staff of the group (Figure 1).

The following data are shown on the overlay: coordinates, targets or concentrations (numbered) by phase lines, targets during the battle in the depth, planned standing barrages and concentrations for repelling counterattacks. Phase line numbers and signals for fire transfers are indicated on the margin. This overlay is supplemented by a chart showing concentrations, their size, areas from which fire transfer signals are to be given, and who is authorized to request barrages and concentrations.

Mortar batteries and the mortars of infantry companies and battalions should fully participate in the artillery preparation and

in the support of the attack, coordinating their fires with the fires of the artillery groups. Their fire missions are limited to their respective zones of action.

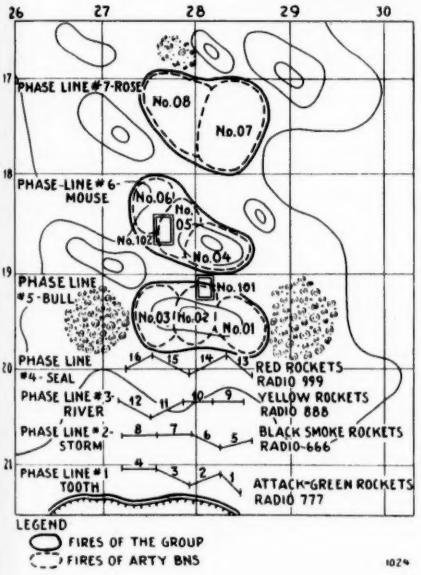
Fire missions for mortars are assigned by the commander of the artillery group together with the artillery commander of the infantry regiment. Then the commander of the infantry regiment determines when the mortars are to be committed in the artillery preparation and support of the attack, assign fire missions, and determines the amount of ammunition to be expended. The commanders of the battalions assign supplementary fire missions to the mortar companies and coordinate their fires with those of the artillery battalions. Fire missions of the mortar batteries and companies should be formulated with the same precision as the fire missions of the artillery battalions and incorporated in the schedule of fires of the artillery attack.

The artillery commander of the infantry regiment indicates on the ground to the mortar unit commanders fire missions assigned by the regimental commander and checks their readiness to conduct fire.

By the end of artillery preparation, the mortar companies, by order of the battalion commanders, displace forward as close to the assault line as possible. Upon completion of their fire missions for the period of support of the attack, the mortars are placed under the commanders of infantry battalions (companies). They support the action of the battalions and protect their flanks. The mortar platoons of infantry companies always remain under their company commanders.

OVERLAY OF FIRES OF DIRECT SUPPORT ARTILLERY GROUP DURING THE PERIOD OF SUPPORT OF THE ATTACK AND OF THE BATTLE IN THE DEPTH.

[Coordinates in this case are read right and down. The coordinates do not in all cases agree exactly with the sketch, probably due to errors made in the redrawing of the original sketch.—*THE EDITOR.*]



Bns	Phase Lines. Sector Numbers. Their Width and Coordinates of Right Flanks			
	1st Phase Line	2d Phase Line	3d Phase Line	4th Phase Line
2/12	No. 1-250	No. 5-200	No. 9-250	No. 13-190
	28490-21200	28500-20820	28520-20490	28600-20250
3/12	No. 2-200	No. 6-200	No. 10-250	No. 14-250
	28150-21150	28200-20880	28130-20480	28300-19920
2/105	No. 3-250	No. 7-250	No. 11-250	No. 15-250
	27980-21180	27940-20800	27820-20500	27910-20060
1/90	No. 4-200	No. 8-250	No. 12-250	No. 16-250
	27500-21060	27400-20760	27300-20500	27340-19880

Fire Zones			
2/12	Fire Zone No. 01	Fire Zone No. 04	
3/12	Fire Zone No. 02	Fire Zone No. 05	Fire Zone No. 07
2/105	Fire Zone No. 03	Fire Zone No. 06	Fire Zone No. 08

Control:

1. Fire transfer signals: first line of moving barrage—from Hill Nut; second line—from . . . etc.
2. Right to request standing barrage "L" and concentrations—Group Commander; other barrages—Arty and Inf Bn CO's.

FIGURE 1.

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Highlights of the Normandy Landings

From an article by Brigadier General H. S. Sewell in *Britain* (British Information Services) August 1944.

THE landings in Normandy came as a surprise to the Germans, who, for various reasons, considered an attack more likely at some other point. The air forces, operating from England, had given no indication, by their action in April and May, that a landing was intended west of the Seine. For weeks during the early spring they had concentrated on bombing the railways which serve the coastal area of northern France and Belgium. It was not till soon before the landings were made that the Loire bridges were destroyed and direct communication from the south of France to Brittany and Normandy was cut.

It is probable also that other means were employed to draw the enemy's attention away from the locality where it was planned to establish beachheads. Feints were made at many points, either just before or at the same time as the main operation. The means by which these were effected have not been disclosed, but the next morning the German radio announced Allied landings at every place of any strategic importance between Le Havre and the Channel Islands, a clear sign that the ruse had worked as intended.

Tactical surprise was achieved by the speed with which the Allied armies were built up from the beaches. The Germans had always thought that the capture of a port was necessary before a properly equipped army could be deployed for action. The story of how the Allies accomplished what the Germans considered impossible has yet to be told, but it is known that the quantity of material put ashore on the beaches in the first few weeks would, under normal conditions, have taxed the unloading capacity of all the ports of England.

Training and Technical Skill

Two factors in the preliminary training and planning contributed largely towards the initial success of the Allied operations: (1) the high standard of physical fitness and technical training of the troops, and (2) the development of high explosives, coupled with experience gained in the Mediterranean and Pacific, showing how saturation bombing could neutralize defense.

The assault on the heavy coastal defenses was started at 11:30 PM by the Royal Air Force Bomber Command, and continued after dawn by the United States Army Air Force. During the night attack the RAF used the same method that they employ against war plants in Germany. Each target was marked first by Pathfinders with target indicators on the ground. The main body of bombers then followed and aimed their bombs where the glare of the indicators showed the target to be. Each of the ten batteries was attacked by one hundred heavy bombers. As there was little fighter opposition, the bombing was done deliberately; and as the journey was short, the bomb loads were probably big. More than 5,000 tons of bombs were dropped on the ten batteries before daylight.

Navy Blockade

The clearing of lanes through the minefields for transports and landing craft and providing close covering fire on the beaches were two of the many duties which were carried out by the Allied Navies with superlative skill. The procession of ships, passing to and fro across the English Channel, had to be guarded from attack by enemy submarines, surface craft, and airplanes. German submarines have not attempted to operate in the Channel during this war, but there has never before been such a target. The fact that the U-boats from the Bay of Biscay have not interfered with Allied shipping on its way to Normandy is due to the efficiency of the Navy's antisubmarine protection. The German destroyers that did try to reach the channel were intercepted near the coast of Brittany by a force of British and Canadian destroyers and in the action which followed a large proportion of the enemy craft were sunk or damaged.

The Germans have a considerable force of light surface craft based in French ports, which they use for coastal convoy escort duties. They are fast and well armed and are a menace to shipping within reach of the harbors from which they operate. The efficiency of the methods used by the Allied Navies against these craft has been admitted by the enemy.

The German naval war reporter, Max Karl Feiden, was quoted by the German radio on June 14 as saying: "Our E-boats and motor torpedo boats are obliged to sneak out of port, as every exit is barred by a veritable floating city of enemy warships. We also have to deal with the ten times accursed enemy shipping illuminations. The scene is like the 'West End' in peace time. By day we never undress and hardly ever sleep. We are getting more like infantrymen in the front line in Russia."

"Locus"

The first men to land on the beaches were the Landing Obstacle Clearing Units, known in the Army as "Locus." Their task was to remove under-water obstacles and their work was timed to be done at low water when the obstacles could be got at more easily. They were unarmed, dressed in cold-resisting underclothes covered completely by a green rubber garment, like a tight overall bathing suit. They were selected men, not volunteers, and only good swimmers were chosen for specialized training as "Locus." They were provided with masks to enable them to stay under water long enough to fix the charges with which they destroyed the off-shore obstacles. Their work was carried out effectively under close enemy fire, and as the tide rose the first landing craft swept in through the gaps which they had blasted through the barrier of underwater obstacles.

Flail Tanks

The first landing craft carried "flail tanks" which literally beat their way through the minefields on the shore. These weird looking vehicles are ordinary tanks—now mostly Shermans adapted in British factories—with a steel cylinder fitted across the front. To the cylinder are attached a number of lengths of chain several feet long. As the tank moves forward the cylinder revolves rapidly and the chains are whirled round, lashing the ground in front of the tank and exploding any mines buried in its path. The comparatively low rate of British casualties on the beaches must in part be due to the use of this vehicle.

The Secret of Victory

Translated at the Command and General Staff School from a German article in *Pester Lloyd* (Budapest) 11 March 1944.

THE cause of the mighty German victories is the moral basis of the Wehrmacht. The moral structure alone is well nigh decisive. The American conception is the exact opposite of the German. This conception bases the hope of victory on material superiority, on the unparalleled output of American industry which is able in a short period of time to put out enormous masses of guns, tanks, planes, and ships with which the Germans will be beaten.

In so mighty a war, which is to decide the form of a new epoch of human history, it is not only fitting but it is a duty to make the attempt to discover the causes whence victory springs in the case of a victorious people. The well known and eminent military writer, General Kabisch, says this in one of his works: "There is one thing, however, that we must understand clearly, and that is that war today has assumed other forms than those it had at the time of Clausewitz, and that although the intellectual basis of his reasoning may still be sound, the deductions which he draws from it must be changed."

Clausewitz teaches that strategy is the employment of battles for the purposes of war. The factors which determine this employment, he divides into moral, physical, mathematical, geographical, and statistical ele-

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ments. He classifies with the moral elements everything that is the result of mental peculiarities and their operations; with the physical, the magnitude of the armed forces, their composition, the ratio existing between the various arms, etc. Clausewitz himself assigns principal place to the chief military potentialities, and these he designates as the talent possessed by the generals, the victorious virtues, and the national spirit of the army.

He designates as the national spirit of the army enthusiasm, fanatical zeal, belief, and opinion. These dominate the German Army today.

And in this connection, he is no longer in agreement with our times when he says that the national spirit of the army is more to be observed in mountain warfare since here every one down to the last soldier is left to his own resources. This being left to one's own resources, in contrast to the dense formations in which battles were generally fought in his time and on down to 1870, has become the rule today because of the tremendously increased power of the weapons employed. Time and again the individual soldier is left to himself, to his own decisions, to his own inner moral strength. This belongs unquestionably with what our military philosopher classifies as the "martial virtue of the army," which is essentially different, according to him, from mere bravery, from the "urge of unbridled action and display of force," which is inborn in the individual as a consequence of racial and hereditary tendencies, as a consequence of the necessity of submitting to obedience, to orders, to rules.

No war can be won by the employment of half-way means and half-way measures. But weapons will not fight all by themselves. They receive their value through the men who handle them, and along with this the talent of the general in the field is decisive.

Again we are able to credit Clausewitz with being in the right: "It is not mathematical figures, not whether one should attack to the right or the left, that brings victory to the general in the field, but the correct estimate of the enemy, the daring readiness to employ weak forces in one place in order to achieve superiority in another place, the correct conclusion with regard to the decisive point, and the ability, through quick decision, suddenly to assemble superior forces at this point—these are the great missions of the general and in them lies the preponderating share of the forces of victory which fall to his lot." Regarding the necessity of surprise, Clausewitz states: "Only by secrecy and speed can it be achieved! Both require great energy on the part of the general in the field and on the part of the army, great earnestness as regards the service. With weakness and lax principles it is vain to count on surprise."

Thus is unfolded before our eyes the picture of a victorious nation. This nation has grown up in the consciousness that only hard self-discipline, readiness to give one's all, and unqualified obedience of one's leaders are able to bring the victory which, in this world of never-ending wars, must be won over and over anew. It is permeated with the knowledge that where there exists a national army the whole nation also must be imbued with the spirit of the army in order that the nation may not become weak and thereby impair the solid foundation of its army.

In the present-day struggle, a nation can hope for victory only as long as it remains true to itself.

A command is always sufficient in itself; there should be no explanations or excuses for it.

—From "Thoughts on the Training of German Soldiers," by a Captain in the German Army.

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